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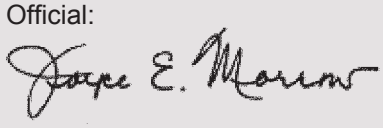

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DEPARTMENTS

FEATURES

Clear The Way

Brigadier General Bryan G. Watson
Commandant, United States Army Engineer School

As the Commandant of the Regiment, one of the key tasks I've charged you with is "Breeding the Army's Most Adaptive Leaders… Inspired With Passion." Our noncommissioned officers (NCOs) play the most crucial role. They are heralded as the backbone of the Army, but our NCO Corps is far more than that…far more vital to the life and legacy of this Regiment. Our NCOs—from sergeant to command sergeant major—are our Regiment's DNA, responsible for breeding leaders. Let me explain and then give you a challenge.

From the outset of my career, I was—and still am—awed by the role our NCOs play in the combat effectiveness and long-term vitality of our Regiment and our Army. Sometimes we don't see it…or perhaps we have grown so accustomed to being surrounded by super NCOs that we take it for granted. But have a discussion with a leader of any other nation's army, and it will quickly turn to the extraordinary professionalism of our NCO ranks. They see it immediately and attribute the superiority of our Army to one thing…our NCOs. It has been that way since our birth as a Regiment, an Army, and a Nation.

We often use various parts of the human body as analogies to describe someone's contribution to the team. The cliché that NCOs are the backbone of the Army has been around forever…accentuated by NCOs with great pride and resolve whenever they recite the NCO Creed. I suppose that it alludes to a number of attributes—our Army's courage to stand up for what is right being just one of them. But we also describe the role of NCOs as the eyes and ears of the commander, the muscle that propels the unit into action, the shoulders that do the heavy lifting, the brains that organize a unit for the mission, the hands that mold future generations of Soldiers, the backs on which a unit's success rides, the heart of any organization, the exacting eyes that ensure unit discipline and guarantee readiness, the soul that keeps us going in adversity, and the conscience that discerns right from wrong when confronted with ambiguity. No doubt, NCOs are all these things and more.

No single analogy fully describes the premier role of the NCO in our Army or captures our reliance on them as a Corps. But I'll add one more analogy to the mix because I believe it captures the most important responsibility of our NCO and Corps. It is one they alone own. The Corps of NCOs is our Regiment and our Army's DNA—that complex code found in all living cells. It is the living set of instructions that is passed from one cell to another during growth and tells the new cell (1) what it is to be, (2) what function it is to accomplish and how it fits in, (3) what form it is to take, and (4) how it contributes to the larger organ and its sense of belonging to something bigger than self; and ultimately, (5) it gives the body its unique identity and form. Like our NCOs, we don't really see our DNA or its function. However, it is fundamental—the very essence of who we are.

Let me give you some examples of how NCOs pass on our Army's DNA. It is the NCO that is the Soldier's first and lifelong example of what right looks like. Every time an NCO interacts with a Soldier—on or off duty—there is a form of cell division that takes place. It passes on the enduring values and leadership traits that are unique hallmarks of our Army to the newer generation. As our primary trainers and coaches, NCOs have the responsibility to inculcate Soldiers with the necessary skills, inspiration, and gut-feel to be effective members of the team, unit, and Army. NCOs transform our Nation's youth into Soldiers… into Warriors…and then into Warrior Leaders. NCOs give Soldiers their very form and function and, in so doing, shape our Army. They breed their replacements! And it is the NCO who is an officer's very first teacher, coach, and sometimes mentor—an officer's most trusted and important advisor throughout his/her career. NCOs are experts—technically and tactically—and teach the officer to bridge from classroom theory to combat application. They coach leadership and keep officers grounded in Soldiering and Soldiers. They inspire us that we may inspire others. No matter what rank, we learn who we are from our NCO Corps.

So here is the question and my challenge to you: Have you promoted good "cell division" within your outfit? Do you foster a climate that allows NCOs to fulfill their role and obligation as the Engineer Regiment's DNA? To our NCOs, are you actively passing on the DNA that is vital to our Regiment's success and legacy? Are you helping police our ranks to ensure that the right DNA is passed on to new generations? Make it a priority; look for opportunities! Don't do it because this is the Year of the NCO, but because our future depends on it…perhaps now more than ever.

Lead The Way

Command Sergeant Major Robert J. Wells
United States Army Engineer School

My Other Battle Buddy

The Regiment and its Soldiers have to keep pace with growing technologies to continue to be relevant on the battlefield. The acceleration of technology is growing exponentially: What used to take twenty years to progress now takes five.

A pleasant surprise we've seen in the last five years is the birth of a new friend on the battlefield—the robot. No more going out and investigating whether an improvised explosive device (IED) is real or fake. Got to clear a danger area? Call on your "Other Battle Buddy," the robot. The technology that went into building today's robot gives us enough situational awareness to allow us to make an informed decision. How much better will robots be in another five years?

Unmanned aerial vehicles (UAVs) were used in combat before the ground versions. World War I started the concept by miniaturizing the Sopwith Camel and controlling the plane with radio frequencies. We continued to use UAVs in World War II as a training aid for antiaircraft gunners and also as attack aircraft.

The first use of ground robots in combat was at the Battle of Normandy in World War II. The German army's engineers operated a robot called the Goliath. The robot was 2 feet wide and 4 feet long and carried approximately 200 pounds of explosives. Operated by a German sapper using a telephone cable, the robot was designed to engage tanks and infantry formations and destroy buildings and bridges.

The Regiment's engineers are learning to use robots as a part of framework operations. For route clearance teams, using robotics is an everyday occurrence. Mounted on the exterior of vehicles, robotic arms and cameras allow Soldiers to investigate potential hazards without exposing themselves to the possible threat.

Robots unconditionally trust you to make the necessary decisions, and they are willing to go anywhere and do anything for you. You communicate with them either through a set of wires or by electronic signals. The speed of that communication is getting faster with the improvement of the computer (brain) and your reaction time, which will improve the more you work with your Other Battle Buddy.

What kind of improvements will we see in future robots? Some things we can expect is a better interface than what we're using now. The Army is working on a 3D simulator that trains Soldiers to go out on a patrol. It is only a matter of time before that type of interface is available for you and your robot out in the field.

A robot isn't limited by the size that we humans grow up to be: The size of a robot is entirely dependent on the task we require it to do for us. Routine tasks such as filling Hesco® barriers, searching confined areas, digging fighting positions, pulling security, recovering vehicles, performing routine maintenance, breaching obstacles, emplacing anchorage systems, surveying terrain, and crossing gaps are just a few tasks a robot can accomplish for the Regiment.

So let's hear from the Regiment. What are your opinions of your Other Battle Buddy? What would you like to see from tomorrow's robot? Send your ideas to me in an e-mail at <*bobby.wells@us.army.mil*> and we'll include them in the next issue of the *Engineer Professional Bulletin*, along with an exclusive interview by one of our engineer Soldiers with a combat-tested robot that just returned from a deployment.

Stay safe.

"Where a new invention promises to be useful, it ought to be tried."

—Thomas Jefferson (1743-1826), U.S. Founding Father, drafted the Declaration of Independence, third U.S. President

Show The Way

Chief Warrant Officer Five Robert K. Lamphear
Regimental Chief Warrant Officer

Wow! This year's ENFORCE was everything that was promised and more. The conference featured two firsts: the inaugural Engineer Warrant Officer of the Year Award (see article on page 21) and the inaugural Council of Engineer Warrant Officers. I'm happy to report that 29 warrant officers attended our first Warrant Officer Council and information briefings.

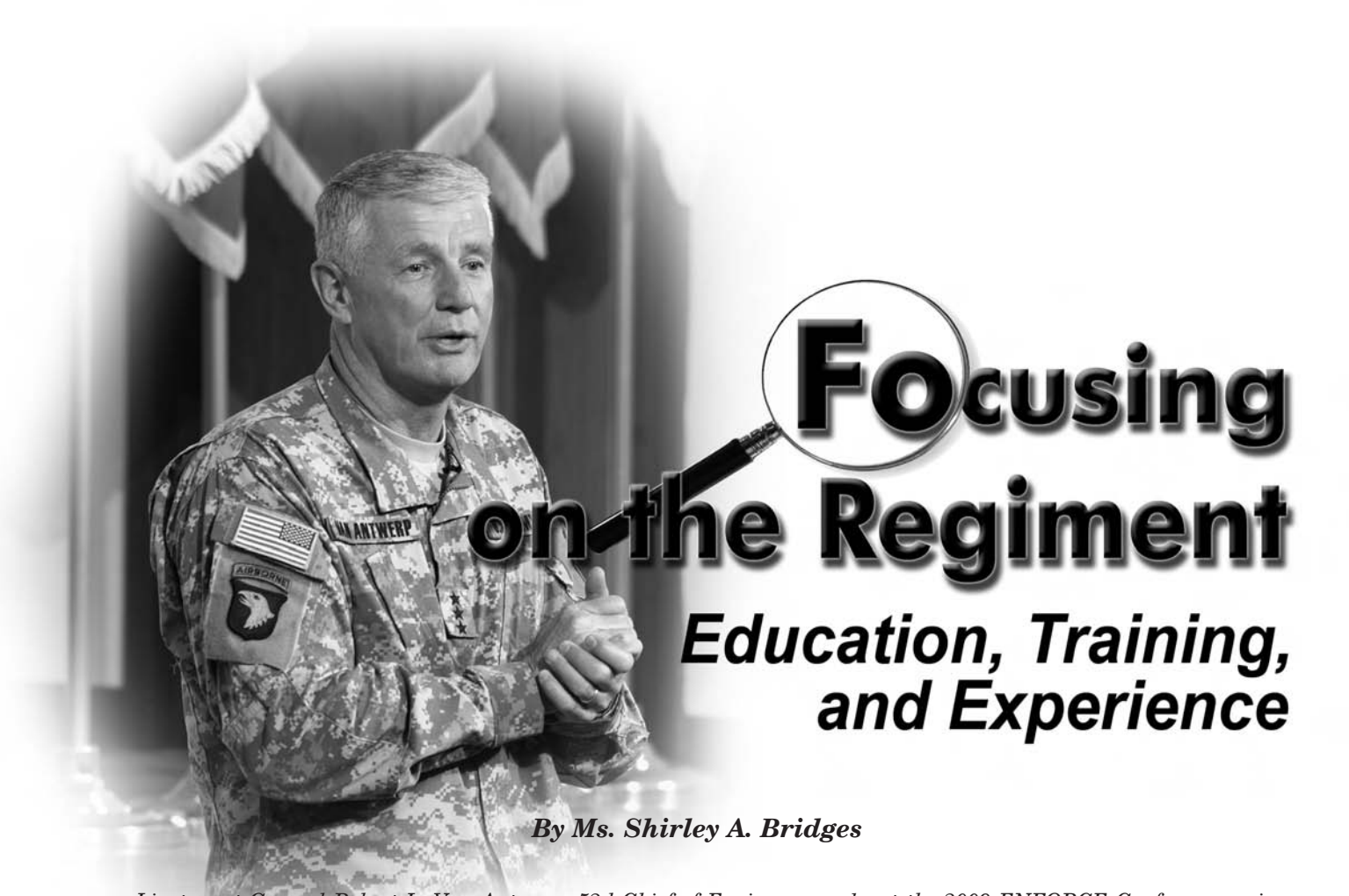
The morning session included briefings from the Council members and a comprehensive Warrant Officer Education update by CW4 Mark Pitsenbarger of the Army Leader Development Office (ALDO). The afternoon session consisted of professionally facilitated discussions led by CW5 Mark Jensen, Command Chief Warrant Officer of the Kansas Army National Guard. The Council deliberated four main issues, and the recommendations are in various stages of implementation. The Council—

- Established a multicomponent recruiting committee to create a professional trifold advertisement for the 210A and 215D accessions program. Thanks to WO1 Dennis Connor of the United States Army Reserve for developing the first draft. The United States Army Recruiting Command has agreed to work with the Engineer School to fund the trifold as part of a pilot test for warrant officer recruiting.
- Voted to recommend to the Commandant that MOS 210A be renamed Construction Engineering Technician to formally recognize the change in mission requirements for this diverse MOS. These requirements, which support modularity and are driven by FM 3-0, *Stability and Support Operations*, include support of vertical platoons, survey and design teams/detachments, engineer brigades, maneuver enhancement brigades (MEBs), divisions, and corps.
- Will recommend to the Commandant that MOS 215D be renamed Geospatial Engineering Technician to better reflect the core mission of geospatial warrant officers and align this warrant officer MOS with its NCO feeder MOS, Geospatial Engineer.
- Validated the proposed change to the standards of grade for MOS 210A to reflect the changes in mission requirements being executed in both training and assignments of 210As.

CW4 Pitsenbarger provided a very timely update to the Warrant Officer Council that included the current status on the Warrant Officer Staff Course (WOSC) and Warrant Officer Senior Staff Course (WOSSC) redesigns. The redesigned WOSC, which was implemented in January 2008, will expand to a 5-week course in FY11 and include a revamped distributed learning (dL) phase. In addition, a CW4 technical functional course will be added as part of the WOSC. Army funding for development of the new 210A and 215D technical functional courses has been approved, and the Engineer School will soon receive the first year's funding allotment. The WOSSC, the capstone Professional Military Education (PME) for CW5s, has been increased from 2 to 4 weeks with a dL portion as well. The first pilot class will be conducted this summer, with final implementation in FY11.

Training experts at the Directorate of Training and Leader Development, led by CW4 Phil Mowatt, LTC Phillip Kaufmann, and Dr. Troy Messer, have received the Commandant's approval and support for the expansion of the 210A Warrant Officer Basic Course from 12 weeks to 26 weeks. This extraordinary effort, if approved by TRADOC, will fundamentally change both what we train and how we train our Construction Engineering Technicians. The submission of this program of instruction (POI) change addresses a shift in strategy for integrating 210A warrant officers in support of modularity, doctrine, and standards of grade changes. The new course will bridge the technical competency gap created under modularity and FM 3-0. More to follow as the staffing process continues with this major Engineer School initiative.

While the ongoing improvements in both leader and technical training at the institutional level are impressive, PME alone will not be enough to fully *Breed the Best Leaders* or *Build Great Engineers*. As the commandant stated, "Great leaders improve on the areas they are weak in." I challenge you to recognize your weaknesses and use the resources at your disposal to improve your leadership abilities and technical competency. Start and/or complete your civilian education with an engineering emphasis, enroll in dL courses, or complete certification courses related to your warrant officer specialty. Take the Commandant's challenge, and search out engineering firms at your duty station and develop training relationships—sabbaticals—for as little as 30 days or as long as 90 days, working with industry. Talk to your commander and get it started—today. Keep your technological edge—it's what makes you a warrant officer! Stay safe. Essayons!



Focusing on the Regiment

Education, Training, and Experience

By Ms. Shirley A. Bridges

Lieutenant General Robert L. Van Antwerp, 52d Chief of Engineers, spoke at the 2009 ENFORCE Conference, using many of his own experiences when growing up to illustrate various aspects of education, training, and experience that were applicable to Army leaders. And instead of giving his views on the current state of the Engineer Regiment, he handed an index card to each person in the audience, and throughout his speech, he mentioned areas where he wanted input from the attendees to be written on the cards. Several of his topics came from books that are being used in the Building Great Engineers campaign.

"We did a little thing with the commanders yesterday," he said. "We had them think about, or write down, the name of someone they really admire, and then write one characteristic of that person that they admire. It's interesting that a number of them said, 'It's my father.'"

LTG Van Antwerp spoke of his father as being someone he greatly admired. "Speaking of education and training, we built a number of houses all along the way. My dad's a mechanical engineer, so I'm a mechanical engineer. Because he loved it, I love it. And so it just was a natural. In one of the houses, we put a grease pit in the garage because he loved cars. And the grease pit was cool—it had steps going down to it, and we had a steel plate that was on rollers, so it was easy to roll that back and expose the pit, then you could drive in and never have to jack your car up."

He said that it was in that garage with his dad that he first learned the principle of *quantity* and *quality* time. And one of the considerations he thinks we have today is how to give the right amount of quantity and quality time to the units for which we have responsibility for oversight, but that are not at our own installation. "How do you do that so a captain or a lieutenant doesn't feel abandoned out there?" he asked. "How do you do it when the battalion headquarters is gone and several of the companies are still on the installation? I think we're under stress in that today."

"Here's what I learned from my dad," he said. You never get to the quality time until you give the quantity. I know with my kids, you can say, 'How was your day?' and you won't get the quality. But if you go out and wrestle and you play some football and stuff and then you're all sweaty and you're sitting on the front porch drinking some Gatorade©, you might find out how their day went. But it takes that. So I'm into quantity. And that's why this week, I hope you felt you had the time to actually spend some quantity time and get to that quality."

Van Antwerp said that he drove a 1953 Riley convertible to high school. He explained that for those who didn't know what a Riley is, it's an English car that looks like a big MG. "It was really a cool car," he said, "but it spent a lot of time in our garage because the Riley

was no longer being made and parts were hard to find. My dad was a great mechanic, and he was also an inventor. He had a machine shop in our basement, and once when my Riley needed a valve, my dad found one from a GM vehicle, and he redesigned it on a lathe to fit my car. And that was my dad."

He said that in that garage, he learned how to train himself and others, which has come in handy during his 37 years in the Army. At first it was him watching his dad work. And his dad would say, "I need a 3/8-inch wrench—or a 10-millimeter wrench"—or whatever. And whichever tool he asked for would be perfect for that job. "That was an art," Van Antwerp said, "but after spending so much time doing that sort of thing, my dad just knew what he needed. But it was very interesting; at first, I just handed him his tools and watched closely. I learned how he organized things."

"The unit has to buy into you before it will buy into where you want to go. So you establish that through your character, your principles—through your being. And then a lot of them will go with you. That's the personnel part."

"I learned a lot from my dad," he said. "Some of it was from spoken things, but a lot of times it was from just observation. Books will tell you that 90 percent of learning—especially for men—comes through your eyes. And my dad knew that; we would talk some, but a lot of it was just silent movement. As I continued to help him, I wanted to learn to hand that 10 millimeter box wrench to him before he asked for it, so I started to anticipate what he'd need. And then over time, the conversation changed to 'Why don't you go ahead and take that nut off?' or 'You go ahead and put that part back together.' Then eventually it was, 'Hey, Dad. I'm doing this; can I use the garage?' And he would say, 'If you need any help, I'll come out.'"

"That's how I learned to train," Van Antwerp said. "And it was an awesome upbringing that I had. So I bring that to the table. We're all products of our experiences. So the message here today is that your example is enormously important to our Army and what you're doing."

He later spoke of the example that the Regiment leadership is trying to set. "We want to set the example of getting the right people in the right seat. We try and match up your skills, your experiences, your education—but the other thing we're trying to do is match what you want to do to your job. Because we all know that if you're passionate, if we can get you in that place where your passion can come out, that passion just increases your talent, and it also makes it easy for the people you work for. That's what I want. If we get you in, all we have to do is give you the boundaries and keep you from just going off, but we know you will do it."

He said that in this day and age, he thinks we automatically dismiss any kind of individual personnel replacements. "The truth is," he said, "in the Army, the Corps of Engineers, we have 20 or 30 percent of our people going in on individual replacement. So it isn't a pure ARFORGEN; maybe for a brigade combat team (BCT) it is, but not necessarily for us. So there are two types of handoffs going here—you have handoffs of units, and then you have handoffs of people."

Then he asked the group to write three things on the index card that they'd been given earlier:

- Disciplined people
- Disciplined thought
- Disciplined action

Using the framework from the book *Good to Great*[1] by Jim Collins, *disciplined people* refers to having the right people on the bus and in the right seat on the bus. It has the notion of a Level 5 Leader—one with personal humility who has an insatiable will for the organization to go where it needs to go. And he or she sees that picture and is going to take you there—through persuasiveness or influence. "But," he said, "if you get into a unit and you think the first thing you're going to do is put your plan into effect, I suggest to you that there's one thing that has to happen before that: The unit has to buy into you before it will buy into where you want to go. So you establish that through your character, your principles—through your being. And then a lot of them will go with you. That's the personnel part."

Disciplined thought is what you do when you get the right people and they put disciplined thought against your business. "Let me give you a thought on priorities," he said. "The reason I use a timer when I speak is to have a little fun, but the other part of it is that we have to operate efficiently—and within the time we're allotted. And one of the things we cannot create more of is time. A lot of you may wonder—and people often ask me: 'How are you doing it? How do you manage your time?'"

"Well," he said, "I'll give you a little insight into how I do it. I believe very much in a simple principle called the Pareto Principle—a 20-80 principle. For a long time I've thought about how to get this done when you go into a new job. And how do you do it so that you are getting the max out of your time? Well, here's what the principle says: If you have a picnic, 20 percent of the people you invite will eat 80 percent of the food. Here's what it means in your priorities: the top 20 percent of your priorities will produce about 80 percent of the productive results. I would also suggest that 20 percent of your time yields about 80 percent of the results—those really focused efforts."

Van Antwerp said that an interesting thing is that if you're a lion trainer and you go into a lion cage, you take two things— a whip and a chair. Normally, between the whip and the chair you're going to get the lion to sit down. The chair has four legs on it. Since a lion or a wild animal is used to attacking a single thing, when you put that chair in the face of the lion, it paralyzes the lion. "What is it about the chair that paralyzes the lion? Well, it's those four legs coming at it, all at the same rate. And the lion can't figure out which leg is the most important. It's all about focus."

"If we aren't careful, we can do the same thing to our people. We can give them so many things that they're all coming at them, and if we don't say, 'That leg up there—that is the important leg,' they won't know what to do first. But I have plenty of time to do what I do. My saying is that I have plenty of time to do what God needs me to do; I don't have all the time to do what I want to do, but you have to have some focus on this. So that's what we have to be about."

In the *disciplined people* part of their card, he asked the group to write their advice to him or the Engineer School commandant on something they should take up that has to do with the people part of this. "I know we have some groups that are doing the *Building Great Engineers* thing, and it's going to be a great day tomorrow as we look at that," he said. "But if you think we have a real problem with putting our arms around our engineers who are in other locations where we don't have the lieutenant colonels and the colonels, then let me know."

Van Antwerp said that he also wanted the attendees to put on their card what they think the Regiment should be putting *disciplined thought* into today. "It may be something that you know we're already taking on, and you just write that down and put an exclamation point—that's where you ought to be going," he said. "But if you're thinking about something that you haven't heard here—and you think the Regiment needs to be thinking about it—then write that on your card. I talk a lot about Wayne Gretzky and hockey because I love it, but when Gretzky was asked 'What's your secret?' he said, 'I skate to where the puck is going to be.' That's the disciplined thought part for leaders—Where is the puck going to be?—so help us out on that one."

"Finally," he said, "if you think we're at the point where we should be putting *disciplined action* into something we're not putting it into today—something that we're still talking about and you want to say, 'I wish we'd stop talking about this and just do it'—then put a 'Just do it!' on the bottom of the card."

Van Antwerp reemphasized with attendees his "Big Four" for great organizations. He said that some of these apply directly to their organization, and some apply more to the Corps of Engineers. "But there's one thing you have to do for people if you're going to take them somewhere—you have to create a picture of what it looks like there. Here's my picture for the Corps of Engineers":

You have to deliver a superior performance every time. He said that that's what we're ultimately paying for. "We have that in our creed," he said: 'I'll always place the mission first.' You have to deliver. When that BCT commander turns to you and asks, 'Engineer, where can we put a forward operating base so we can have running water and some security? Tell me what I need—barriers, T-walls, all that.' You don't want to walk backward and give them the impression you don't know what you're doing there, so how do we make sure that we have the right people there and that we can deliver? We *have* to deliver. Those of us who have experienced Katrina know that we're only as good as our last project."

You'll set the standard for your profession. He said that if you're in real estate, get a real estate license; if you're a program or project manager, get a program management professional (PMP) certification; if you're an engineer or an architect, get your professional engineer (PE) certification. "Let's crank it up professionally, and then when you deal with our contractors and other partners, you're dealing at the same level."

Where you (as a unit) and you alone can make that unique contribution to this nation or other nations, you need to do that. He said that in the Corps of Engineers, one of those unique things is about water. "We know a lot about water. We're very developed, compared to Africa or other places, on reservoirs and how to deliver hydropower. Another thing, something that only we could do, was build a fence along the southern border of this country. Why? Because they needed our regulatory expertise, and they needed our real estate. And we have many other projects."

You have to make sure your unit is built to last. Jim Collins wrote *Built to Last*[2] before he wrote *Good to Great*; that is one of our marks. For the Corps of Engineers, what does that mean today? "Having the right people right-seated on the bus," he said, "and we need 3,300 more of them than we have. We know what we need to do to get the job done. And what we don't want to do is hire temporary workers to do that; we want to hire Department of the Army civilians so when we come through this, we're going to look back and say we built this to last. So, those are our markers."

"I so appreciate all of you," he said. "It's an honor and a privilege to be a part of this. I wake up every day and express in my heart what a privilege it is that I get to do this—for whatever time they'll leave me here. And I hope it's forever."

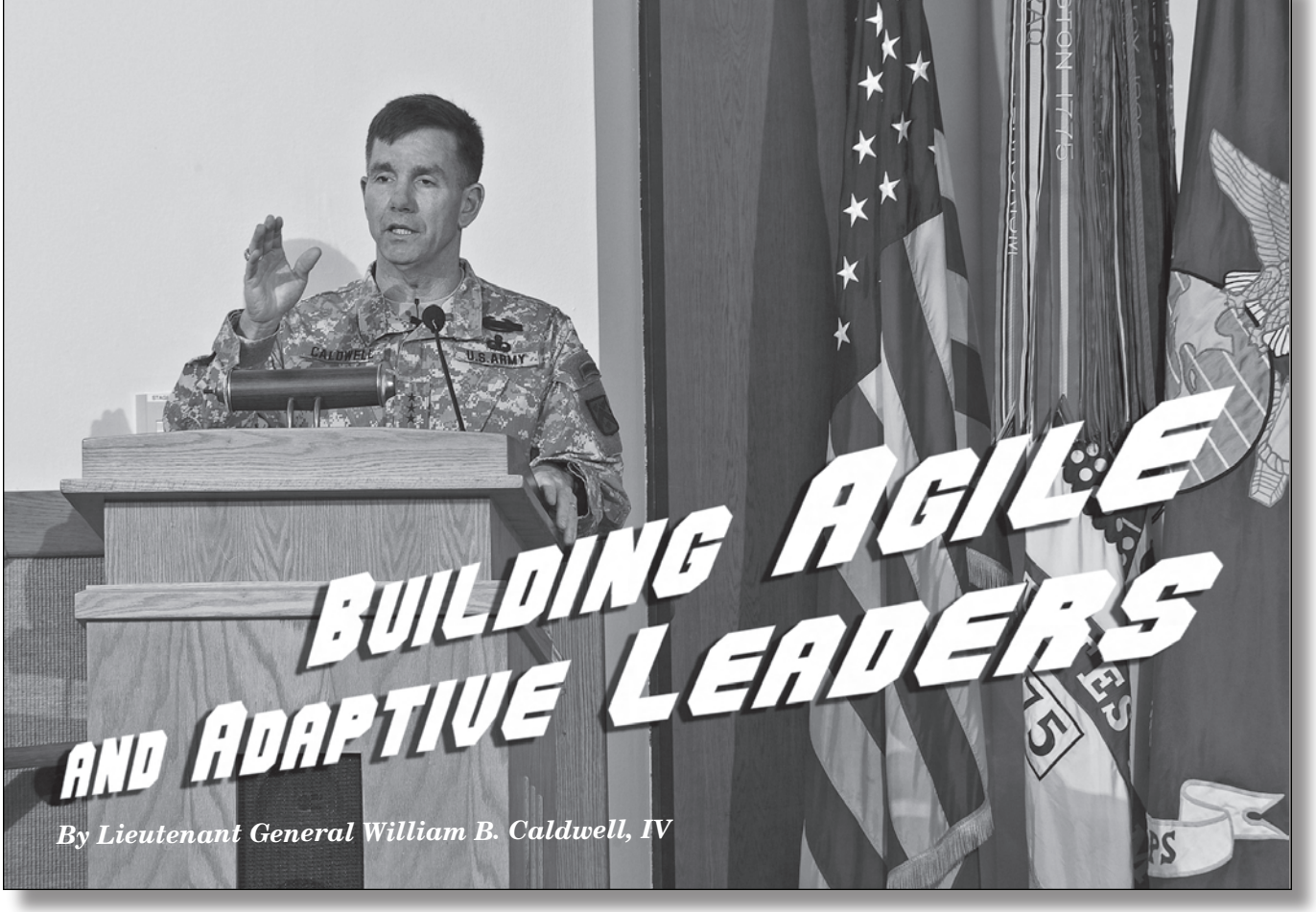
"God bless you all; keep up the great work."

Ms. Bridges, managing editor of the Engineer Professional Bulletin, has been a member of the bulletin staff for the past 14 years. She holds a bachelor's from Missouri State University, Springfield, Missouri.

Endnotes

[1]*Good to Great* by Jim C. Collins, Harper Business: New York, 2001.

[2]*Built to Last* by Jim C. Collins and Jerry I. Porras, Harper Business: New York, 1994, 1997.



Building Agile and Adaptive Leaders

By Lieutenant General William B. Caldwell, IV

Note: This article is adapted from a speech given on 23 April 2009 to attendees of ENFORCE 2009 at Fort Leonard Wood, Missouri.

Engineer history is inundated with success stories of agile and adaptive leaders contributing to our nation's progress. You are the organization that gave us the United States Military Academy, the Washington Monument, the Panama Canal, and the Pentagon, and you are in greater demand today than ever before.

The United States Army Corps of Engineers is at work in more than 90 countries, supporting 159 Army installations and 91 Air Force installations and operating 609 dams and 257 navigation lock chambers at hundreds of sites. You operate 24 percent of America's hydropower capacity. Engineers are serving as architects, ecologists, geologists, park rangers, accountants, cartographers, chemists and, most notably, as warriors.

Since 11 September 2001, approximately 70 percent of our engineer force—that's including the newest engineers that haven't even had an opportunity to deploy—have served our nation in a hostile area at least once. More than 30 percent have deployed multiple times. And it's more than just deployments…the unique, but critical, aspect of engineer life is the important and complex missions you perform daily all over the world and many in the continental United States. From the mountains of Afghanistan to the Red River in North Dakota, Army engineers are the most diverse group of selfless servants in our Army today.

Engineer versatility is illustrated in the accomplishments of the *Building Great Engineers* campaign that includes improvements in working with accessions, improvements in the classroom, and efforts to align assignments with training and education. Engineers are "clearing the route" and "marking the lane" for all of us to move forward and meet the challenges of the 21st century—a century that is marked by the rising threat of a violent extremist movement that seeks to create anarchy and instability throughout the international system. Within this system, we also face emerging nations that are discontented with the status quo and seeking a new global balance of power. As our nation continues into this era of uncertainty and persistent conflict, the lines separating war and peace, enemy and friend, have blurred and no

> ***"Engineers are 'clearing the route' and 'marking the lane' for all of us to move forward and meet the challenges of the 21st century...."***

longer conform to the clear delineations we once knew.

Understanding how to operate in this complex and ever-changing environment of the 21st century is critical to the development of our leaders. This environment will require leveraging every element of our national power and includes cooperating and collaborating with nongovernmental and international organizations. As our President said during his recent announcement of a comprehensive Afghanistan strategy, "A campaign against extremism will not succeed with bullets or bombs alone…to achieve our goals we need a stronger, smarter, and comprehensive strategy." This means that our Army has a requirement to develop leaders capable of operating effectively within this comprehensive approach.

Figure 1

Our country needs agile and adaptive leaders to lead us in this changing world—the 21st century (see Figure 1). The Chief of Staff of our Army has used the analogy that our force must resemble a middleweight fighter. We must be a lean, agile, and rapidly adaptive force with the endurance and knockout power to take on and defeat any opponent, regardless of weight class. By carefully studying his adversaries and with modification to the fighter's training and diet, the middleweight can easily move between weight classes and defeat any opponent. Just as with that middleweight fighter, our Army needs to be equally versatile, equally decisive, and equally lethal.

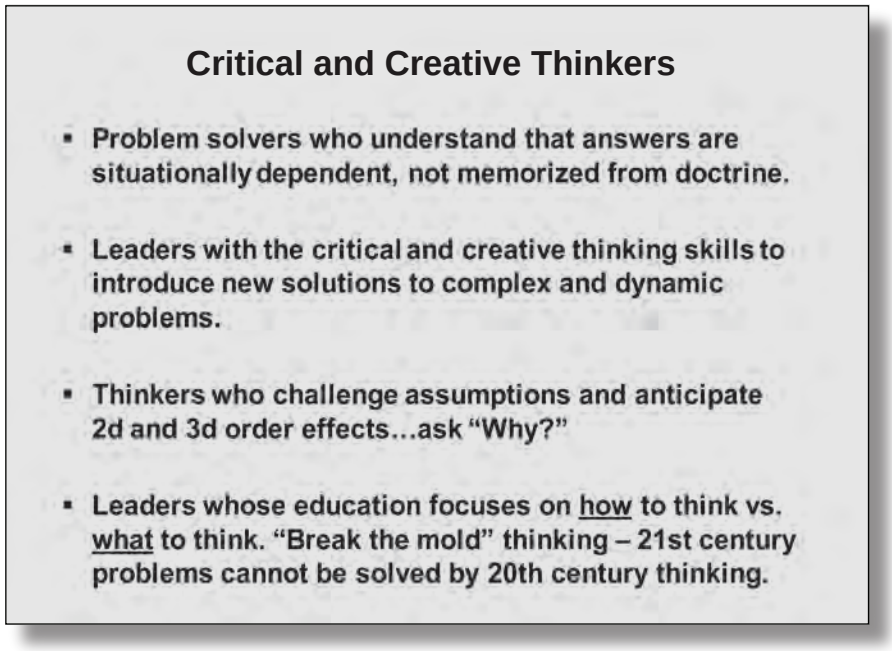


Figure 2

We must understand that military force—although necessary—is not sufficient; it does not win the peace. Probably no one understands that better than you! Engineers are lethal warriors and nation builders. You have always operated across the full spectrum of conflict; you embody better than anyone else our nation's destructive and constructive capabilities. As engineers, being agile and adaptive is already in your DNA; you get it…and it could not be more clearly illustrated than in the 4th Engineer Battalion when they just received a change of mission from Iraq to Afghanistan—after operating in Baghdad for only two weeks.

We need agile and adaptive leaders who are broad enough to handle the challenges of full spectrum operations in this era of persistent conflict. These agile and adaptive leaders must be *critical and creative thinkers*, they must be *competent and confident communicators*, and they must be *capable of operating with a comprehensive approach* to meet these emerging challenges. These critical attributes will enable our leaders to contend with offensive, defensive, and stability operations simultaneously…leaders who can integrate combined arms, integrate with host nation forces, and be perceptive enough to discern changes in the operational environment in order to anticipate transitions.

What do we mean by critical and creative thinkers, and how does that translate to leader development (see Figure 2)? Well, some people will tell you the glass is half full, and others will say it is half empty. But the engineer will tell you the glass is twice the size it needs to be. This is the kind of out-of-the-box thinking we need—critical and creative thinkers who are courageous enough

Figure 3

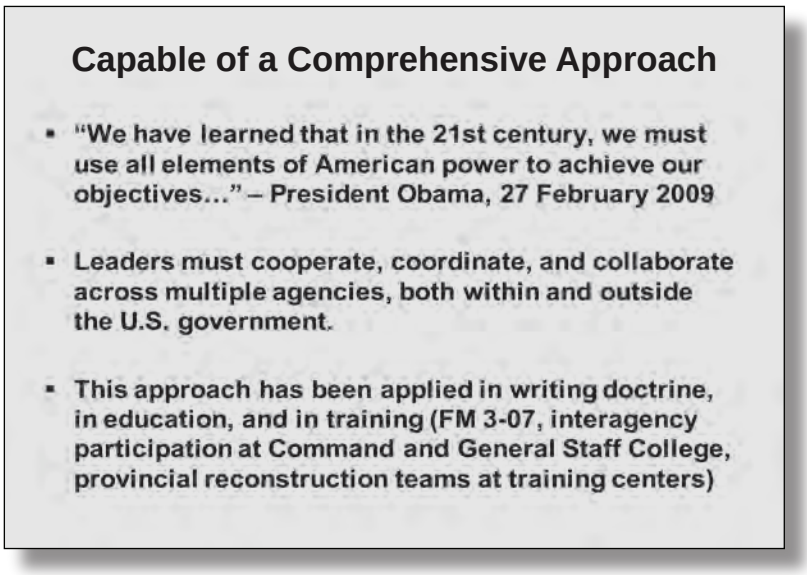


Figure 4

to see and exploit opportunities in the challenges and complexities of the 21st century.

What good are critical and creative thinkers if they cannot communicate their ideas? Our leaders must be competent and confident communicators (see Figure 3). Competence, we know, builds confidence, which leads to capable communication. We must strengthen our leaders' ability to communicate in a wide variety of information mediums. So how do we develop competent and confident communicators?

Knowing that we will always operate in a joint, interagency, intergovernmental, and multinational (JIIM) environment makes this communication even more important. We must recognize that our leaders will not only be required to communicate across foreign cultures but also must know and understand how other organizations operate (such as the Iraqi army, Department of State, nongovernmental organizations, private voluntary organizations, businesses, and academia). Our leaders must be capable of operating with a comprehensive approach (see Figure 4). Leaders must cooperate, coordinate, and collaborate across multiple agencies from both within and outside the U.S. government. Our leaders must be able to unite diverse groups of people and work toward a shared goal. Agile and adaptive leaders are comfortable in the complex and ambiguous environments we already face today and are going to be the combat multiplier we need in the 21st century. Engineers consistently work in these complex environments, operating with Air Force REDHORSE squadrons, Navy Seabee units, the National Geospatial Agency, the Joint Improvised Explosive Device Defeat Organization (JIEDDO), and other foreign engineer forces and civilian agencies to accomplish missions in Iraq, Afghanistan, and around the globe.

We've discussed how to develop agile and adaptive leaders and the kinds of attributes those leaders must possess to succeed in the 21st century, but what about facilitating this lifelong development in units and organizations around the Army? What about encouraging and empowering these agile and adaptive leaders? That is a real challenge of ours. To do so, we must be courageous in our approach (see Figure 5, page 11).

We build all these leader skills through education, training, and experience. We must be mindful as we move forward that we don't make the mistake of substituting experience for education. Experience is critical, as long as it is the right experience; and our training is outstanding, as long as it is the right training. But what prepares leaders to make decisions in a complex uncertain environment is the combination of education, experience, and training. The combination of all three is what gives us our greatest versatility.

Our Army Values and the Warrior Ethos will remain the underpinning of our educational and training efforts as they prescribe conditions that facilitate trust, interdependence, and cohesion among Soldiers. They also set the standard for how our Army will interact with individuals outside of the Army. All this must be grounded in our Army Values and the Warrior Ethos—the same Army Values and Warrior Ethos epitomized by approximately 1,800 engineers that have received valorous awards for their actions in Iraq and Afghanistan. Examples of this courageous action include the following:

- Billy Zar, the captain of a debris-removal tug boat operating in Texas, reacted instinctively when his team saw a 500-gallon fuel tank floating in dangerously high water in the Industrial Canal during Hurricane Gustav. They knew that if the tank were to hit the flood wall or other important structures, there could be grave consequences. So, without hesitation, Billy courageously jumped into the water and corralled the 500-gallon tank, possibly saving countless lives and protecting property. For his actions, he was recognized by Lieutenant General Robert B. Van Antwerp, Chief of Engineers.
- Staff Sergeant Lincoln Dockery, who charged an enemy position to fight through an enemy ambush in Afghanistan. During the charge, Dockery was injured, but he kept going despite intense enemy fire that included hand grenades and incoming rocket-propelled grenades. After pushing the enemy back from their position, close air support was called and reported that there were more than 30 enemy fighters. For his actions, he was awarded the Silver Star.
- Sergeant First Class Paul Smith's courageous actions to defeat an enemy attack at the Baghdad International Airport resulted in as many as 50 enemy soldiers killed, while allowing the safe withdrawal of numerous wounded Soldiers. For his actions, he was awarded the Medal of Honor.

Our Soldiers are blessed with these types of leaders… courageous, selfless, serving leaders. We owe it to our nation to develop leaders of character and value…leaders who have the mental agility to anticipate and adapt to uncertain or changing situations…leaders who can integrate the tools of statecraft with our military forces, international partners, humanitarian organizations, and the private sector… leaders who can forge unity of effort among a very rich and diverse group of actors to shape a better future . . . a better tomorrow. And those leaders are sitting in this auditorium today. Each and every one of you bears this mantle of leadership. You are our most versatile force, and for more than 200 years our nation has called on you to be the most agile and adaptive element in our Army…and we will continue to do so in the 21st century.

Thank you for inviting me to be a part of ENFORCE 2009.

Figure 5

Lieutenant General Caldwell is the Commanding General, United States Army Combined Arms Center and Fort Leavenworth, and the Commandant, United States Army Command and General Staff College, Fort Leavenworth, Kansas.

Dedication

The following members of the Engineer Regiment have been lost in the War on Terrorism since the last issue of *Engineer*, or were inadvertently omitted from a previous list. We dedicate this issue to them.

George, Major Jason E.	252d Combined Arms Battalion, 30th Heavy Brigade Combat Team	Fayetteville, North Carolina
Keesling, Specialist Chancellor A.	961st Engineer Company, 844th Engineer Battalion	Sharonville, Ohio
Johnson, Jr., Specialist Isaac L.	Alpha Company, 48th Brigade Special Troops Battalion	Statesboro, Georgia
Wallace, Sergeant Daniel W.	Charlie Company, 201st Engineer Battalion	Cynthiana, Kentucky
Williams, First Lieutenant Derwin I.	Troop B, 2d Battalion, 106th Cavalry Regiment	Dixon, Illinois

ENFORCE 2009: Commandant's Senior Leaders Discussion

By Lieutenant Colonel Scott C. Johnson

When Colonel Bryan G. Watson, United States Army Engineer School Commandant, addressed the ENFORCE 2009 attendees midweek of the conference, with the purpose of opening a dialogue within the Regiment concerning its future and direction. Embedded in the discussion were his initial assessment and thoughts on the purpose and unique aspects of the Regiment and objectives and key initiatives that support and improve the Regiment's mission. The following is a summary of that discussion. You can see a video of the entire presentation at the Engineer School Knowledge Network (ESKN) at <https://www.us.army.mil/suite/page/126> .

Through this article, other ENFORCE articles in the *Engineer Professional Bulletin*, and recent and future engagements with senior leaders within the Regiment, the goal is to expand the discussion, validate the content, and get your input. Additionally, this summary will increase your situational awareness with regard to the issues facing the Regiment and the commandant's priorities. As always, your voice is important in this refinement process, and we welcome your comments.

Summary

The discussion began with the Commandant's thoughts on the Engineer Regiment and its place in the United States Army.

The Engineer Regiment is a subprofession of the larger profession of arms (see Figure 1, page 13). It is a body of people—not just equipment, organizations, or technology—with a passion or calling to serve as Warriors with technical skills. These technical skills set the Engineer Regiment apart via its unique services and knowledge that the Army needs to accomplish its missions. To prepare our Soldiers and civilians to accomplish their missions in support of the Army, the Regiment requires special education, apprenticeships, and practice.

As with any endeavor in the Army, there is a constant tension between being effective and trying to garner efficiencies. For the Engineer Regiment, effectiveness is paramount and must trump efficiency. Likewise, service to the Army (our client) trumps self-gain and advancement of the Regiment. In other words, a decision that negatively impacts the Regiment in terms of personnel, equipment, material, or other measurable element is the right decision if the overall benefit to the Army is positive. This isn't to say that the Engineer Regiment is stepping up to be a bill payer. To the contrary, it simply means that the Engineer Regiment cannot be seen as being parochial in all decisions and actions.

With this type of attitude and approach, the Engineer Regiment will continue to enjoy a special relationship of trust within the Army. In turn, this will allow the Regiment to assess, train, and develop the right people; organize itself to best serve the Army; and hold itself accountable for its successes and failures. This accountability includes the need to regulate and police itself and its personnel via evaluations and administrative actions given and taken by our senior leaders.

A key aspect of the Engineer Regiment's success is its adaptability. The ongoing modification and changes to the modular engineer force that are occurring due to feedback from operations, and the leader development *Building Great Engineers* initiatives are prime examples of our institutional adaptability. Working hand in hand with the United States

Figure 1

Army Maneuver Support Center (MANSCEN), the United States Army Training and Doctrine Command (TRADOC), and the Department of the Army, the Engineer Regiment is continuing to look for innovative ways to increase its effectiveness while working within the left and right limits imposed by higher headquarters due to resource constraints on the Army (that's the tension between effectiveness and efficiency discussed earlier).

Commandant's Campaign Plan Framework – The Purpose of the Profession of Army Engineers

It is important for everyone to understand the Engineer Regiment's purpose and its role in the overall military profession within the United States Army (see Figure 2, page 14). First and foremost, engineers bring three unique capabilities that support the overall effort of the Army during operations and drive training requirements during peacetime: combat engineering, geospatial engineering, and general engineering.

These unique capabilities are brought to bear along three to four major lines of engineer support that provide warfighters from platoon leader to combatant commanders with the ability to successfully execute missions and operations. Engineers assure mobility, enhance protection, and enable expeditionary logistics; a new emerging line of engineer support is building capacity.

There is a debate concerning whether building capacity is a line of engineer support or just a role engineers can assume based on the mission and their inherent adaptability, core technical training, and historical affinity to step up and "Let Us Try." Since ENFORCE, we have taken the approach that elements of building capacity should be a line of engineer support. However, there are still major implications that have to be studied to ensure that changes to our doctrine, organizations, training, material, leader development, and all the rest are identified, recognized, funded, and institutionalized to support the Army.

The Engineer Regiment's unique capabilities, combined with its lines of engineer support (current and future), define the reason we exist. Specifically, its combat, geospatial, and general engineering capabilities brought to bear along the lines of engineer support ensure that maneuver commanders have freedom of action and the ability to operate across the full spectrum of conflict, to include peacetime engagement. As a Regiment, we must ensure that our capabilities continue to meet the demands of both our doctrinal missions and the emerging requirements generated during our operational employments.

The commandant noted several key tasks that engineers must do to ensure that the profession is positioned for success. First and foremost, we must—as a Regiment—breed the Army's best and most adaptable leaders inspired with the passion to excel in generating capabilities and employing engineer forces along the lines of engineer support to ensure overall mission success. To do this, we must be and remain clear on the Regiment's purpose and role within the Army.

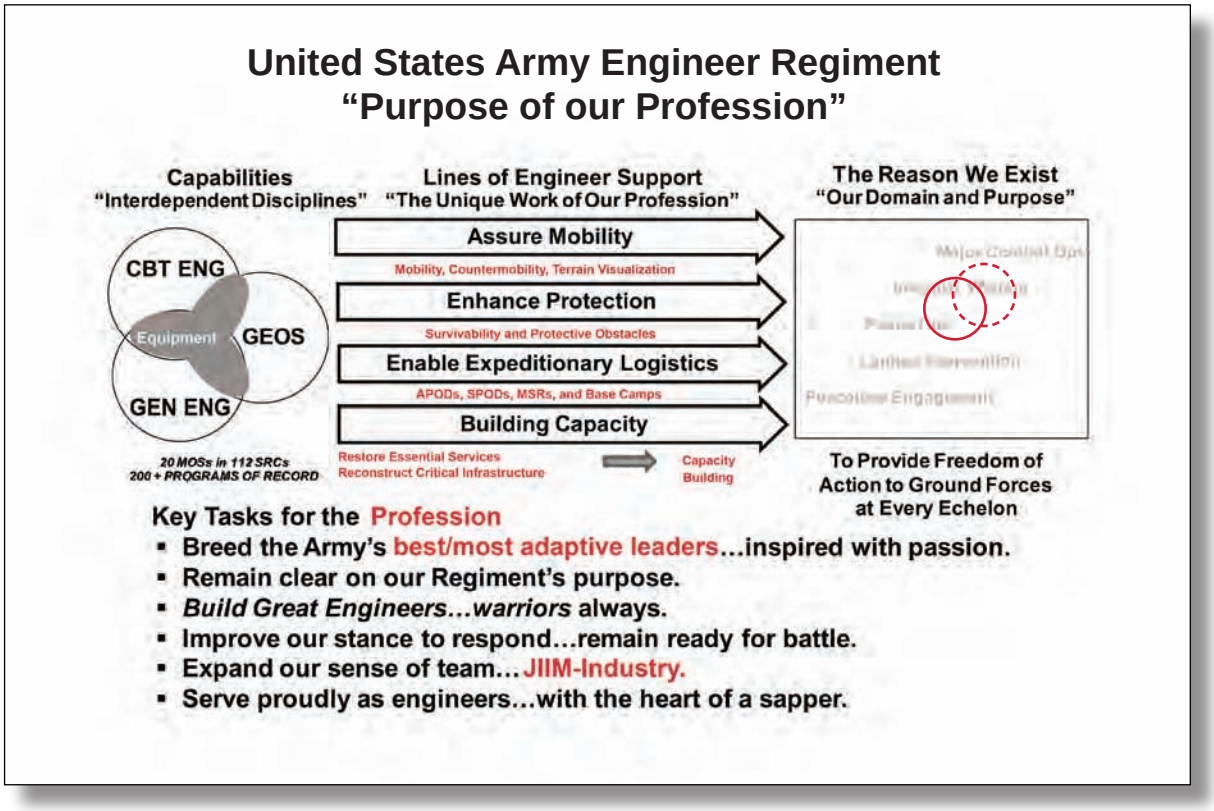


Figure 2

Furthermore, our leaders must be the military engineering subject matter experts. At the same time, as members of the greater military profession, engineer leaders must be warriors who can walk the walk and talk the talk to ensure that engineer units fully support our maneuver brethren. Our leaders must be inspired by our purpose as an Engineer Regiment and inspire their fellow sappers to serve proudly as engineer warriors.

Additionally, engineer units must be trained and equipped to execute their unique missions as engineers and be able to adapt to perform other missions that the operational situation demands. Modularization and modernization must continue to ensure that engineers remain ready for battle and are continuing to improve their stance to respond to their nation's call.

Along the same lines, engineer leaders and planners must reach out to other Services, agencies, and nations to access the right resources (such as capability, knowledge, and capacity) at the right time to accomplish the mission. At times, the right organization to execute a particular mission may be an industry partner. Our leaders expand our sense of team to include our joint, interagency, intergovernmental, and multinational (JIIM) partners and industry experts.

It is essential that engineer leaders know and understand how to quickly and effectively tap into these JIIM and industry resources and use them to enhance mission success. Not only is it imperative that we train and work with our partners during predeployment and mission preparation exercises, but engineer leaders must also be trained and educated on how to bring our JIIM and industry partners to bear on the challenges of the future.

Commandant's Vision – Initial Components

"Engineer warriors leading to serve ground forces: A Regiment inspired to answer the commander's call"

Regimental Family of Families. The Engineer Regiment is a family composed of both military Servicemembers and civilian employees—the Regiment cannot afford to ignore one or the other group. Likewise, the families of our sappers and civilians are part of our regimental family. Engineer leaders must be cognizant of the impact their decisions have on our families and the impact our families have on our sappers' service.

World's Best Military Engineers. The Engineer Regiment must establish itself as the world's best military engineers.

Warriors Always. Sappers must be warriors in their own right while being the experts in bringing military engineering capabilities (combat, geospatial, and general engineering) to bear.

Leading to Serve Ground Forces. Tied back to our purpose and the unique calling of the subprofession of military engineers, the Engineer Regiment is a regiment of service. We execute our missions to enable the Army to execute its mission. We are leaders who are dedicated to service.

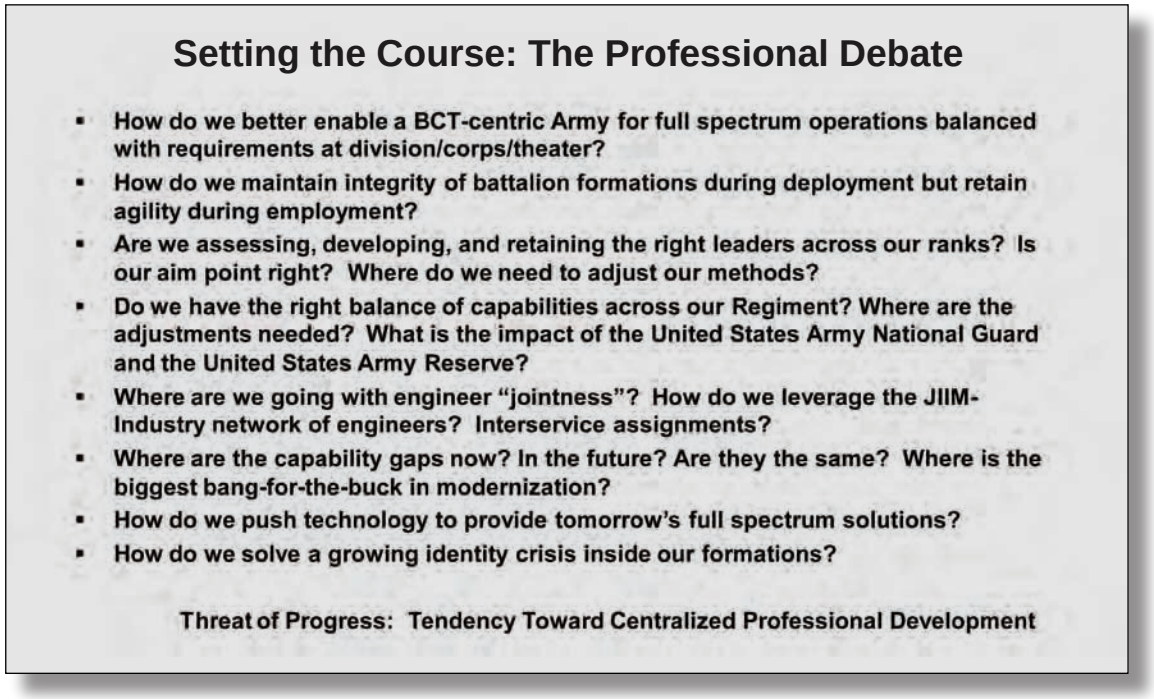


Figure 3

Answering the Commander's Call. As always, the Engineer Regiment has a history of taking on seemingly impossible missions and executing them beyond expectation. This standard of excellence sets us apart as an invaluable member of the Army team.

The Most Flexible and Adaptive Units. Engineer units also have a history of assuming new roles and missions as they arise during combat operations. This is a direct reflection of the trust Army leaders have in the ability of engineer units to adapt to changing requirements and the flexibility of our leaders. The legacy of flexible and adaptive units must continue.

Soldiers and Civilians That Inspire Each Other. A key characteristic of the Engineer Regiment is the trust and confidence its civilian and military leaders have in each other. The inspiration gained via the mutual respect of skills and competencies generates an enormous amount of synergy when solving complex problems and is a key trait of the Regiment.

Soldiers Who Dare to Demand "Let Us Try." From junior Soldier to senior leader, the Engineer Regiment is known for its continual drive to achieve the impossible. When others have tried with limited success, engineers have routinely stepped up and achieved success. No matter how difficult, no matter how dangerous, no matter how complex and daunting, engineers past and present step into the breach and clear the way.

Setting the Course – The Professional Debate

In the near term, the commandant identified several key issues to focus the Engineer Regiment on resolving many of the issues it is currently facing. While there are many issues, the eight listed in Figure 3 are currently at the top of the list and have broad and far-reaching impacts. It is critical that we as a Regiment keep the dialogue and discussion open and professional to ensure that we identify issues that will impact the Engineer Regiment in the future.

The Engineer School and Regiment as a whole are working many of these issues now. The brigade combat team engineer battalion, *Building Great Engineers*, total army analysis processes, engineer coach and career advisor, future combat system developments, and JIIM and industry partnership developments are all ongoing initiatives that will address our issues.

The commandant is prepared to expand the debate and address issues across the Engineer Regiment. Your thoughts, ideas, and proposals are essential to this process. Keep the cards and letters coming.

Perhaps more important, it is essential that we as a collective professional organization embrace our heritage, our purpose, and our reason for being. If we all internalize the concept of unselfish service with a heart of a sapper, it will be a simple thing to inspire our junior sappers to step up and say, "Let Us Try." Developing and promoting this attitude within and across the Engineer Regiment can and will make a difference.

Lieutenant Colonel Johnson is the United States Army Engineer School Chief of Staff. He commanded the 1-3 Brigade Special Troops Battalion, 1st Brigade Combat Team, 3d Infantry Division, from 20 June 2006 to 17 June 2008.He holds a master's in administration from Central Michigan University and a master's in military arts and sciences from the School of Advanced Military Science.

Army Professional Engineer Continuing Education

By Dr. Troy L. Messer, Major Stephen M. Bert, Major Jason A. Evers, and Major Richard J. Gash

There are several reasons why the United States Army should develop its own program for continuing education instead of using one of the many commercial classes available. The *Building Great Engineers* campaign of the United States Army Engineer School has highlighted the opportunity and value of developing professional credentials, specifically the professional engineer (PE) license. Also, more states are adding continuing education requirements in order to sustain licensure. Army officers have special technical skill requirements as well as unique difficulties in sustaining professional development while deployed. Commercial courses are not developed to address specific Army-related issues. Additionally, commercial courses require units to commit funds or effectively place undue financial hardship on Soldiers to maintain proficiency for the Army's benefit. This supports the need for an Army combat engineer credential that parallels the emergency manager credential in the Federal Emergency Management Agency.

Today the Army is striving to conduct the full spectrum of operations. Engineers provide a tremendous resource for certain aspects of stability operations. PEs in particular could leverage their technical expertise along with their tactical proximity to the operations, in effect becoming a force multiplier. To increase the effectiveness of military engineers, it would be a wise investment to provide them with a professional education program that sustains technical knowledge and provides the most up-to-date training necessary to conduct reconstruction in stability operations. The Engineer Branch has a dual need to satisfy the combat engineer sapper.

Background

The Engineer School has produced more than 970 master's degree students—through University of Missouri–Rolla (now Missouri University of Science and Technology) programs in engineering management, civil engineering, and geological engineering—to build its technical competency base in support of the brigade combat team (BCT).

The Army is now, and will be for the foreseeable future, formed around the modular BCT. Therefore, decentralized execution of stability operations is inherent in today's operating environment. Brigades need access to trained PEs. It may be in the form of an engineer coordinator or an attached field engineering support team, but engineering expertise should be an integral part of the BCT staff. Field Manual (FM) 3-07, *Stability Operations and Support Operations*, provides a framework for conducting stability operations. From that FM, the authors have developed a construct for professional engineering support to stability operations. FM 3-07 outlines the following three intervention phases of stability operations:

- Initial response
- Transformation
- Fostering sustainability

Initial Response

One of the fundamentals of successful stability operations is to quickly create positive and lasting change in the environment. It is from this fundamental that the holy grail—security—is most effectively enabled. During the initial response phase, military forces will be focused on providing food, water, shelter, and medical support to the host nation. While engineers will have a crucial role in planning for, and providing support for, the initial response, it is in preparing for the subsequent phases that they have the greatest capacity to positively affect stability operations.

Transformation

The trained PE will be able to facilitate effective and rapid transition through the phases. As stability operations move from initial response to transformation, a trained engineer will be able to rapidly effect local reconstruction. This will be achieved by conducting early and effective engineer reconnaissance of reconstruction sectors such as transportation, energy, communications, hazardous waste remediation, water/wastewater, and sanitation. The expertise provided by a PE will facilitate better estimates and enable a more efficient distribution of resources during the transformation phase. Also, construction management proficiency will enable effective construction management at various echelons of the deployed force. This will also create a second-order benefit to overworked contract officers, who have neither the time nor technical expertise to properly oversee the myriad of smaller reconstruction projects in the area of operations.

Fostering Sustainability

One of the challenges of conducting effective reconstruction projects is ensuring the sustainability of the projects after stability forces depart. Army engineers are unique in

their combination of cultural understanding, experience operating in degraded or Third World environments, technical education, and (with help from the proposed continuing education program) their awareness of state-of-the-art engineering solutions. This combination of experience and education will enable engineers from BCT to theater level to develop solutions that will be sustainable within the host nation's probable educational, economic, and infrastructure capabilities.

State Requirements

The authors investigated the continuing education requirements for two states. The first was Missouri, due to the fact that a large number of engineer officers acquire their PE license there. The second state, Montana, was chosen at random. Both states currently have some sort of exemption for licensees serving on full-time active military duty. While Missouri offers a permanent exemption, Montana only exempts those on temporary active duty (United States Army National Guard and United States Army Reserve Soldiers), which seems to indicate that active duty personnel are still required to complete continuing education. Both states require 30 professional development hours in a two-year rolling renewal period. An hour is defined as "one contact hour of instruction or presentation" which should be relevant to the practice of engineering and can include technical, ethical, or managerial topics. Qualifying activities attended in another state are allowed by both states. Missouri allows engineer-related satellite downlink video and computer software courses to complete the requirement. Montana takes a stricter approach, maintaining that "it is not intended that these courses be taken in private, such as a videotaped program in one's home, but rather be conducted in a group setting." However, the Montana guidelines also state that "a qualifying correspondence course should require the participant to show evidence of achievement and completion, and include a final, graded test." Both states require the maintenance of certificates to document individual training sessions and a logbook containing a summary of the entire reporting period.

Educational System

Engineer School Knowledge Network

The Engineer School Knowledge Network (ESKN) module on the Army Knowledge Online (AKO) site maintained by the Engineer School provides an ideal platform for a professional continuing education program. The portal is available to anyone with AKO login credentials. It can be accessed easily from the Engineer School webpage via an unsecured Internet connection. Use of ESKN would reduce the technical overhead required for the program by leveraging AKO's existing security, server, and graphical user interface capabilities. A content manager with ESKN administrator privileges could maintain the technical aspects of the program with little effort. Furthermore, the Engineer School's Blackboard™ suite, which has successfully supported both Regular Army and Reserve Component distributed learning (dL), is well-qualified to be a successful delivery platform as another course of action.

The program could include three forms of continuing education units (CEUs): self-study courses; webinars, or Internet-based seminars; and webcasts. A requirement common to all three content types would be a certificate of completion that students can print and keep in their records.

Course Topics

Courses studied should be based on doctrine and updated to maintain currency with the state of the art in military engineering. Some examples of classes could include:

- Providing food and water
  - Finding subsurface water
  - Analyzing water treatment plants
  - Constructing wells
  - Designing irrigation systems
- Providing shelter and medical support
- Learning structural design
  - Designing wood structures
  - Designing masonry structures
- Conducting construction reconnaissance
  - Identifying critical systems nodes
  - Constructing environmental baseline assessments
- Writing a statement of work
  - Assessing requirements
  - Estimating material, manpower, and equipment costs
- Understanding nongovernmental organization (NGO) and other government agency (OGA) support to reconstruction
  - Understanding the United States Agency for International Development (USAID) organization and capabilities
- Learning fundamentals of construction management in order to oversee contract execution
- Communicating news of reconstruction progress—good and bad—to the public
- Understanding available off-the-shelf designs
- Learning well-drilling and treatment techniques for surface water sources
- Learning how to use the Red Book/Sand Book
- Planning construction education
  - Assessing host-nation level of training
  - Defining training requirements
  - Planning military/NGO/OGA

Self-Study

A great example of a self-study dL course is CE 300, Introduction to Engineering Mechanics and Design. The course is available at <*http://www.west-point.org/academy/ce300/default.htm*>. Developed by the head of the United States Military Academy (USMA) Department of Civil and Mechanical Engineering for students studying abroad, the course demonstrates the enormous potential of web-based self-study. While very effective, the course has two disadvantages: Students must have the required texts on hand, and it takes a lot of creativity, technical knowledge, and time to create. Less ambitious examples can be found in the mandatory online annual training we are all familiar with.

Webinars

In recent years, webinars have emerged within the engineering community as a popular and accepted means of attaining CEUs. They typically require students to log in at a prearranged time and involve varying degrees of teacher-student and student-student interaction. Examples of webinars tailored for civil engineering CEUs can be found at <*www.asce.org/webinar/list*>.

Webcasts

Webcasts are the least interactive—yet easiest to produce—CEU option. They are simply broadcasts of recorded content that can be accessed over the Internet, such as video recordings of classes or presentations.

Summary

The Engineer Regiment needs to establish a formal professional continuing education program to ensure that it will have competent engineers who can positively impact full spectrum operations. A joint effort between the Engineer School, USMA, and the United States Army Corps of Engineers (USACE) could provide the knowledge base and direction for the program. The Engineer School defines the course objectives and incorporates lessons learned to respond to the Army's needs. USMA and USACE could provide the technical experts to teach the classes. An online educational system could conveniently track completion of CEUs and update officer records, as well as provide officers with documentation to meet the state CEU requirements. This educational system could be developed within the framework of the Army's existing systems, while adding great benefit to the Army and individual pride and confidence among officers with PE licenses. A second-order benefit of this program would be a well-developed educational tool to enable all engineer officers to enhance their understanding of engineer solutions to problems encountered in stability operations. The Engineer School is ideally suited to act as the lifelong learning portal by offering technical reachback and managing all Engineer Captains Career Course graduates as an engineer community of practice. Finally, the systematic valuation of continuing education will undoubtedly lead to the retention of the kind of officers that the Engineer Regiment needs in order to excel in the future.

Dr. Messer is the technical director of the Department of Instruction, Directorate of Training and Leader Development, United States Army Engineer School, Fort Leonard Wood, Missouri. He retired from the Army in May 2001 as a sergeant first class after serving four stateside tours, three overseas tours, and one combat tour in Panama during Operation Just Cause. He is an Army Civilian Education System advance graduate.

Major Bert is attending the Army's Intermediate Level Education (ILE) program en route to assignment as a military transition team (MiTT) augmentee with 2d Brigade Combat Team, 3d Infantry Division. Previously, he was a platoon leader with the 11th Engineer Battalion; company commander with the 588th Engineer Battalion; and assistant professor in the Department of Civil and Mechanical Engineering, USMA. He holds a master's in civil engineering from Virginia Polytechnic Institute and State University and is a registered PE in Virginia.

Major Evers is attending the Army's ILE program en route to assignment as an MiTT augmentee at 1st Brigade Combat Team, 3d Infantry Division. Previously, he was an assistant professor in the Department of Civil and Mechanical Engineering, USMA; Commander, Bravo Company, 16th Engineer Battalion; assistant operations and training officer and adjutant, 1st Armored Division Engineer Brigade; and platoon leader and other staff positions for 8th Engineer Battalion, 1st Cavalry Division. He holds a bachelor's in civil engineering from Gonzaga University and a master's in civil engineering from the University of Washington. He is a registered PE in Washington.

Major Gash is a student at the Army Command and General Staff College, en route to assignment as brigade engineer for the 1st Heavy Brigade Combat Team, 2d Infantry Division. Previously he was a platoon leader and company executive officer in the 70th Engineer Battalion; company commander in the 864th Engineer Battalion; and assistant professor in the Department of Civil and Mechanical Engineering, USMA. He holds a bachelor's in civil engineering from USMA, a master's in geology and geophysics from the University of Missouri–Rolla, (now Missouri University of Science and Technology) and a master's in structural engineering from the University of California–Los Angeles. He is a registered PE in Ohio and Missouri.

Endnotes

[1]Missouri Division of Professional Registration, "Continuing Professional Competency for Professional Engineers Licensed in Missouri," <*http://pr.mo.gov/boards/apelsla/Continuing-Education-PE-PDH-Fact-Sheet.pdf*>, accessed 17 December 2008.

[2]Montana Board of Professional Engineers and Professional Land Surveyors, "License Information," <*http://mt.gov/dli/pel/pdf/ce_guidelines.pdf*>, accessed 16 December 2008.

[3]Ibid.

Building Great Engineers

Mentorship Working Group Update

By Lieutenant Colonel Scott C. Johnson

There is no doubt that the modular Army and engineer force has significant operational advantages. Chief among them is the ability to tailor the maneuver and engineer force to achieve mission success with the right capabilities and resources. Modularity also enables the management of modular unit personnel and equipment readiness within the Army Force Generation (ARFORGEN) process. However, there are some shortfalls in how our modular engineer force structure is being employed during this protracted war.

Universally Recognized Challenge

The following scenario is a common experience for many of our active duty engineers:

In June 2006, a young captain took command of a modular engineer company. In September 2006, his battalion commander and headquarters deployed to Afghanistan. In January 2007, his company deployed to Iraq for what became a 15-month tour. During the combat tour, his company worked for three separate engineer battalions and two different engineer brigades. Upon redeployment, he met his new battalion commander, whose predecessor had relinquished command upon redeployment in March 2008.

Within two months, this successful company commander relinquished his command to another young captain. A few months later, this experienced and high-quality officer resigned from the Army. When discussing his decision with his battalion commander, he stated that the lack of continuity in engineer leadership—related to counseling, coaching and inconsistent evaluations due to changing task organizations, and the associated staff assistance that a battalion headquarters normally provides—loomed large as a contributing factor in his decision. While he maintained e-mail and occasional telephone contact with his parent battalion commander, he still felt isolated and alone—cast aside or thrown to the sharks. . . .

Brigade combat team (BCT) engineers are also experiencing a similar form of isolation and disconnection from senior engineer leaders and the Engineer Regiment. Light and heavy BCT engineer experiences are different, but with a few exceptions neither has a direct dedicated command relationship with a senior engineer leader. Due to their placement in combined arms battalions (CABs), many of our heavy BCT engineer companies have also become maneuver-centric in terms of capability and employment.

Even when the brigade special troops battalion (BSTB) commander is an engineer and the engineer company is assigned to the BSTB, the situation isn't significantly improved. The BSTB commander must balance the need to treat all the BSTB companies and Soldiers equally to avoid the perception of favoritism within his unit. The rift that could be created by focusing heavily on engineer professional development would degrade team building within the BSTB.

The dislocation from senior engineer leader engagement isn't limited to engineers assigned to modular units. Many junior engineers are assigned to staffs in nonengineer units across the Army—from training support units to CABs to functional and maneuver enhancement brigades (MEBs). Many lack a training readiness authority (TRA), coaching or career-advising relationship with a senior engineer leader, or inclusion in engineer-related professional development opportunities.

These same situations are also occurring within our United States Army Reserve and United States Army National Guard engineer force structure. BCT engineer companies are separated from traditional regimental-affiliated command and control, technical expertise, and professional development. Modular Reserve Component engineer units are deployed without regard to TRA and state relationships, and many engineers working on staffs do not have a direct relationship with an engineer unit with TRA authority.

During the ENFORCE conference in April 2009, senior engineer leaders met to develop a course of action to address this growing challenge. Organized by Colonel Andy Phillips (Great Britain [GBR]), and facilitated by Brigadier General John Peabody and Colonel (P) "Rock" Donahue, the *Building Great Engineers* Mentorship Working Group (MWG) developed a concept to provide engineer-specific career advice and coaching within the Engineer Regiment that enhances and complements the current modular TRA relationships.

Engineer Coach and Career Advisor Concept

The engineer coach and career advisor (ECCA) is a geographically based senior engineer leader who is invested and entrusted with the responsibility of providing a forum for engineer-specific professional development, technical advice and support, and nurturing and growing Engineer Regiment esprit de corps. The ECCA relationship does not directly equate with TRA or a command or support relationship; however, leaders of engineer units have inherent ECCA responsibilities for units under their command.

For example, the engineer brigade commanders at Fort Hood, Texas, and in Germany would have ECCA responsibilities for all units for which they have direct TRA responsibility, whether they were colocated or assigned to another installation or country. Similarly, the engineer battalion commanders at Fort Stewart, Georgia, or in Schweinfurt, Germany, would have ECCA responsibilities for the units over which they exercise TRA responsibilities. Under the ECCA concept, the aforementioned Fort Hood-based brigade commander—once designated as the ECCA for Fort Hood—would be charged with executing ECCA responsibilities for all engineers assigned to Fort Hood, regardless of established TRA relationships.

The Engineer Branch proponent will be responsible for designating geographically based ECCAs within our Regular Army, Reserve, and National Guard force structure and charging them with promoting engineer-specific professional development opportunities, providing engineer technical advice and support, and nurturing and growing Engineer Regiment esprit de corps for all engineer units and personnel within their designated sphere of influence. The ECCA's responsibilities are designed to complement the direct TRA of physically and geographically separate units. Additionally, the ECCA's responsibilities are designed to be transferred to a forward-deployed senior engineer leader, or to another local senior engineer leader if the primary ECCA is deployed forward. From engineer brigade to engineer staff to engineer team or detachment, all engineer leaders should know who their primary ECCA is, whether deployed or at a permanent duty station.

ECCA Responsibilities

The following ECCA responsibilities will be published in Department of the Army Pamphlet (DA PAM) 600-3, *Officer Professional Development and Career Management*:

- Provide engineer-specific coaching and career advice to junior engineer leaders and/or engineer technical advice and support. For non-TRA units and engineer personnel, this is provided when sought or requested.
- Plan, coordinate, and provide for engineer-specific professional development opportunities for all engineers within the ECCA geographic area of responsibility.
- Promote Engineer Regiment pride, professionalism, and overall esprit de corps.
- Ensure continuity of ECCA effort and services through the designation of alternate ECCAs in the event the primary ECCA is unavailable due to geographic separation resulting from deployments.

ECCA Implementation

Several additional recommendations were developed by the *Building Great Engineers* MWG, and in subsequent discussions, that support the implementation of the ECCA program and improve its goals.

- Align, deploy, and employ modular companies and battalions as units whenever possible. Minimize the practice of deploying modular companies independently from their TRA battalion headquarters. Our United States Army Forces Command (FORSCOM) and Army Assistant Chiefs of Staff, Operations/Plans/Information Engagement (G3/5/7) engineers who work sourcing issues are our implementing agents. Expect this initiative to occur over time as unit dwell times increase.
- Assign key and developmental majors to the BCT engineer positions—and, when possible, assign former battalion commanders to division engineer positions—until an organizational change is implemented that addresses the engineer command and control challenges within the infantry, heavy, and Stryker BCTs. (The brigade engineer battalion force design update (FDU) concept is one of the proposed solutions.) Once validated and approved, the Engineer Branch, in coordination with the United States Army Engineer School commandant, is the lead in implementing this initiative. Available population, dwell time, and competing requirements for these high-demand officers will have an impact on how this initiative will move forward.

- Develop an implementation plan to reestablish and promote Army Engineer Association (AEA) chapters across the Army to assist and complement the ECCA engineer professional development and esprit de corps missions. This initiative could include reaching out to Engineer Regiment retirees and extended Servicemember families to bolster Engineer Regiment identity—expand the base.
- Empower United States Army Corps of Engineers (USACE) division and district leaders, with support from both AEA and the Society of American Military Engineers (SAME), with ECCA-like responsibilities to engage the engineers of the future currently in high school and college across the nation.

The Road Ahead

The first two recommendations will not solve the issues facing the Engineer Regiment. They will, however, position our units and leaders for greater success. Senior engineer leaders embracing and implementing the full ECCA program—coaching and providing career advice, providing engineer-specific professional development and technical assistance, and promoting Engineer Regiment esprit de corps supported by the third recommendation—will have a huge impact over time. Though institutionalizing the ECCA program within DA PAM 600-3 may take a year or more due to the update cycle, we will issue individual charters within a few months. Expect ECCA concept implementation to start with our active duty engineers, then increase to comprise the Reserve Components. Eventually, this program will expand to include our USACE districts and enable the Engineer Regiment to reach out to engineers assigned to the Regular Army and Reserve Components, recruiting, Reserve Officers' Training Corps (ROTC), and joint assignments.

Of course, there is nothing to stop engineer commanders from taking steps now to position themselves for execution within their units or outside their TRA sphere of influence. Socializing this concept with leaders outside the engineer command and control structure (for example, TRA) is deemed critical—ECCA responsibilities do not equate with TRA of nonaligned engineers. What is the strategic message? The ECCA concept will benefit the overall Engineer Regiment, to include the individual technical competence of non-TRA-aligned engineers, and engineer esprit de corps. When implemented by dedicated professional engineer leaders, the Regiment will take a giant step forward.

Lieutenant Colonel Johnson is the United States Army Engineer School Chief of Staff. He commanded the 1-3 Brigade Special Troops Battalion, 1st Brigade Combat Team, 3d Infantry Division, from 20 June 2006 to 17 June 2008. He holds a master's in administration from Central Michigan University and a master's in military arts and sciences from the School of Advanced Military Science.

Warrant Officer of the Year Award

ENFORCE 2009 featured the inaugural Engineer Warrant Officer of the Year award. The United States Army Reserve winner was Chief Warrant Officer Three (CW3) Nathan P.D. Harvel, 321st Engineer Detachment, 844th Engineer Battalion, Bethlehem, Georgia. The Chief of Engineers, Lieutenant General Robert L. Van Antwerp, presented CW3 Harvel his award during the Engineer Ball (shown above with Lieutenant Colonel Adam S. Roth, Commander, 844th Engineer Battalion). The Active Army winner was Warrant Officer One (WO1) Anthony R. Jellison, Headquarters Support Company, 46th Engineer Battalion. WO1 Jellison is currently deployed and will receive his award when he returns to home station. Congratulations to both of these officers for a job VERY well done!

Think you have the "stuff" to be the next Engineer Warrant Officer of the Year? Check out Fort Leonard Wood Pamphlet 672-1, *The Itschner, the Outstanding Engineer Platoon Leader, the Outstanding Engineer Warrant Officer, and the Van Autreve Awards and the Sturgis Medal*, for program requirements at <*http://www.wood.army.mil/doimspt/phamphlets.htm*>.

ENFORCE Council of Colonels

By Colonel James R. Rowan (Retired)

The ENFORCE Council of Colonels met on the afternoon of 21 April 2009. The meeting had been a standard event on the ENFORCE template for many years, but as the ENFORCE venue changed over the past few years, the Council of Colonels had fallen off the agenda. This year's event was highly successful, and attendees agreed that it needs to remain on the schedule.

One significant change to the Council of Colonels this year was that attendance was by invitation only. Previously, the council was open to the Regiment at large and drew a huge crowd. Limiting the members this year was done to keep the Council at a manageable size of about 60 people in order to focus the discussion. The primary invitees were current brigade commanders; colonel-level district commanders; theater engineer command chiefs of staff and deputy chiefs of staff for plans and operations; combatant command engineers; engineers on the United States Army and joint staffs; division engineers; selected program managers from the United States Army Acquisition Corps community; and our doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) domain chiefs from the United States Army Engineer School and United States Army Maneuver Support Center.

The Council of Colonels received briefings and discussed a wide range of topics. Key agenda events included a follow-on discussion from the ENFORCE Pentagon Panel plenary session, led by Mr. William E. Clarkson and Colonel James R. Rowan (Retired), which focused mainly on the brigade engineer battalion proposal; an update from Iraq by Colonel Scott F. "Rock" Donahue; an organizational update by Lieutenant Colonel Stephen A. Danner; and an update from the United States Army Forces Command engineer, Colonel Charles King (Retired), on some of the key training and sourcing challenges that we are facing to support current operations. The highlight of the Council of Colonels was the discussion with the new Engineer School commandant, Brigadier General Bryan G. Watson, who presented his draft vision and framework for the Regiment (see article on page 12). He used the collective wisdom of the Council of Colonels to refine the document and make final adjustments before sharing it with the rest of the Regiment later in the week. The ENFORCE Council of Colonels slides are posted to the Engineer School Knowledge Network site at <*https://www.us.army.mil/suite/portal/index.jsp*>.

Engineer School officials are considering making the Council of Colonels a twice-a-year event and are planning a 1- or 2-day Council of Colonels tentatively scheduled for 3-4 November 2009. For announcements with dates and other details, check the Engineer School website at <*http://www.wood.army.mil/wood_cms/usaes.shtml*> later this summer.

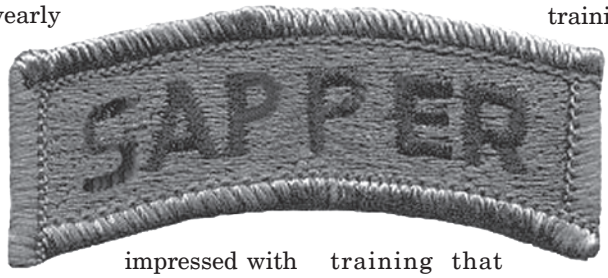
Council of Colonels at ENFORCE 2009

Colonel Rowan (Retired) is the Deputy Assistant Commandant, United States Army Engineer School. Previously, he served as the Assistant Technical Director for Military Engineering at the United States Army Engineer Research and Development Center (ERDC), Vicksburg, Mississippi. Other key duty positions include Commander, ERDC; Commander, 1st Engineer Brigade; Commander, 54th Engineer Battalion; and Commander, 16th Engineer Battalion. He has served in Operation Iraqi Freedom both as a military officer and a civilian.

A Lieutenant's Look at the 2009 Best Sapper Competition

By First Lieutenant Christopher D. Blackburn

Warm temperatures and sunny skies accompanied this year's Best Sapper Competition at Fort Leonard Wood, Missouri, framing the Engineer Regiment's most spectacular yearly event. The Sapper Leader Course cadre—augmented by a cast of hundreds of officers, noncommissioned officers (NCOs), Soldiers, and civilians—engineered a flawless contest of mental and physical strength that left competitors impressed with its rich training quality and professional execution. Teams entered the competition with victory as their foremost goal, but there is a particular group of lieutenants who may find that the value of the competition extends further than just standing on the winner's podium.



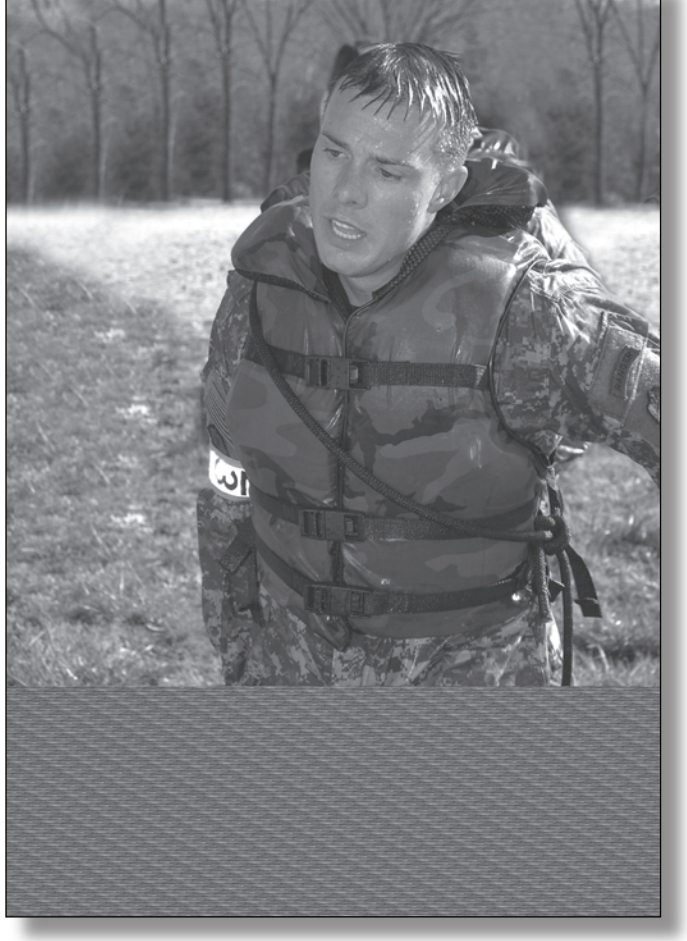
The demands of current deployment cycles leave new engineer lieutenants with one of two ways to get experience as a platoon leader: either during predeployment training or while deployed to Iraq or Afghanistan. While both experiences offer plenty of challenges and learning opportunities, platoon leader time in combat often does not expose the young officers to the wide variety of thorough, engineer-specific training that units conduct when ramping up for a deployment. For example, a new lieutenant fresh out of the Engineer Basic Officer Leader Course (BOLC) II who meets his or her unit downrange and steps into a platoon probably will not have attended a combat lifesaver course or supervised a demolitions range before leading the platoon. Besides the introductory training received

A sapper team sprints to the finish line of the obstacle course in the 2009 Best Sapper Competition.

during each phase of BOLC, platoon leader time is when a young officer is meant to benefit from the mentorship of NCOs and become proficient in engineer skills that he or she will grow to expect of all sappers. Without these training opportunities, a lieutenant in combat may be at a loss when the platoon sergeant suggests using a water impulse charge to breach a steel door or the interpreter asks how to administer an intravenous injection.

As one of those new lieutenants, I found that training for the competition provided the most comprehensive approach to make up for lost time in a garrison environment. Any participant who takes the competition seriously will naturally master basic combat engineer skills, because not doing so will certainly doom a team's competitiveness against the field. Regardless of the technique used to catch up, lieutenants must not replace their foundation of basic engineer knowledge with wartime experiences. Being a platoon leader in combat is undeniably beneficial and often the highlight of an officer's career. But what about time spent as a company commander in a different conflict—perhaps Iraq instead of Afghanistan—where the tactics, techniques, and procedures used as a platoon leader may be inappropriate? Without a strong foundation of basic engineer knowledge and an understanding of the capabilities that Soldiers and NCOs bring to the fight, a commander will struggle to appropriately direct combat power to accomplish the mission. It is up to the individual leader to conduct a self-assessment, identify deficiencies in knowledge or skills, and implement a system to ensure that these gaps are filled.

During no other 52-hour period in a Soldier's career will he or she be subjected to more rigorous, realistic, battle-focused training than during the Best Sapper Competition. While lieutenants typically plan rather than execute training events at squad level and below, the competition offers lieutenants a rare chance to participate for "free"—free of range control, risk assessment, ammunition draw, transportation, and every other administrative duty required to conduct training in garrison. The resourcing headache is gracefully accepted by the Sapper Leader Course cadre, giving participants an opportunity to appreciate the fruitful



A sapper heads for the finish line after the helocast.

A team from the 66th Engineer Company executes the weapons assembly station during the "Sapper Stakes" phase of the 2009 Best Sapper Competition.

Sappers complete the helocast/poncho raft and swim event during the 2009 Best Sapper Competition.

training and establishing a standard to emulate when planning training within their own units.

Cadets at the United States Military Academy commit to memory General Douglas MacArthur's famed opinion of athletic competition in the Army: "Upon the fields of friendly strife are sown the seeds, that upon other fields, on other days, will bear the fruits of victory." General MacArthur, then superintendent at West Point, was speaking of officer athletes attending the Academy, but his message certainly applies elsewhere. Nonstop physical and mental intensity make the Best Sapper Competition the epitome of friendly strife. Given the reliance lieutenants must place on NCOs to succeed as platoon leaders, the strengthening of the officer-NCO sapper buddy team forms the foundation for victory on other fields. Officer-NCO teams took first and second place in this year's competition, as well as the top spots in 2006 and 2007. Most lieutenants, especially platoon leaders, will never again in their careers be more closely surrounded by the experience and counsel of NCOs. This precious resource should be tapped, not just for the sake of building a competitive team but because the bond created during the competition is everlasting and represents the trademark of success throughout our Army's history. Personally speaking, it wasn't asking my sapper buddy how to throw a grapnel hook, but realizing how familiar he was with the tactical details of its employment, that was most memorable. There are many ways to learn in the Army—field manuals, college courses, officer professional development classes, for instance—but nothing tops the decades of experience and the distinctive, plain-spoken message of a prideful NCO.

This year's Best Sapper Competition was the best yet. An engineer lieutenant need not look far for motivation to prepare and compete. The competition has stiffened over the years, but not unexpectedly, considering the event's training value and the prestige of being named the Army's Best Sapper. The rewards for winning are plentiful: Remington shotguns, a Bronze Order of the de Fleury Medal, a rucksack full of gear, an Army Commendation Medal, and many other keepsakes. However, a lieutenant privileged enough to partner with the type of top-notch NCO we expect to shoulder the mission of the Engineer Regiment may have a different perspective on winning. Like past Best Sapper champions, you may be fortunate enough to combine invaluable training and NCO partnership with impressive accolades.

First Lieutenant Blackburn is a platoon leader with the 66th Engineer Company, 2d Stryker Brigade Combat Team, 25th Infantry Division, and served as a platoon leader and task force engineer during the company's deployment to Iraq from December 2007 to February 2009. He is a graduate of Ranger School and holds a bachelor's in civil engineering from the United States Military Academy.

Note: First Lieutenant Blackburn and his sapper buddy, Staff Sergeant Moises Ramirez, 66th Engineer Company from Schofield Barracks, Hawaii, finished among the top 10 in the 2009 Best Sapper Competition. First Lieutenant Blackburn also earned the Engineer Regiment's Outstanding Engineer Platoon Leader Award in 2008.

Photo by Mike Curtis

Regimental Awards

Each year we recognize the best engineer company, lieutenant, warrant officer, noncommissioned officer, and enlisted Soldier—in each of the components—for outstanding contributions and service to our Regiment and Army. Every engineer unit in the Regiment can submit the name and achievements of its best of the best to compete in these distinguished award competitions. Only the finest engineer companies and Soldiers are selected as recipients of these awards. The Soldiers will carry throughout their careers the distinction and recognition of being the Engineer Branch's best and brightest Soldiers and leaders. Following are the results of the 2008 selection boards for the Itschner, Outstanding Engineer Platoon Leader (Grizzly), and Outstanding Engineer Warrant Officer Awards, the Sturgis Medal, and the Van Autreve Award:

Active Army

Itschner Award: United States Army Pacific (USARPAC) nominee, 66th Engineer Company, 2d Stryker Brigade Combat Team, 25th Infantry Division, Schofield Barracks, Hawaii.

Outstanding Engineer Platoon Leader (Grizzly) Award: USARPAC nominee, First Lieutenant Christopher Blackburn, 66th Engineer Company, 2d Stryker Brigade Combat Team, 25th Infantry Division, Schofield Barracks, Hawaii.

Outstanding Engineer Warrant Officer Award: United States Forces Command (FORSCOM) nominee, Warrant Officer One Anthony R. Jellison, Headquarters Support Company, 46th Engineer Battalion, Fort Polk, Louisiana.

Sturgis Medal: United States Army Europe (USAREUR) nominee, Sergeant First Class (P) Marcus McClain, Alpha Company, 173d Special Troops Battalion, 173d Airborne Brigade Combat Team, Bamberg, Germany.

Van Autreve Award: FORSCOM nominee, Specialist Wesley Silver, 58th Engineer Company, 326th Engineer Battalion, Fort Irwin, California.

United States Army Reserve

Itschner Award: 955th Engineer Company, 489th Engineer Battalion, Fort Leonard Wood, Missouri.

Outstanding Engineer Platoon Leader (Grizzly) Award: First Lieutenant Christopher G. Smiley, 955th Engineer Company, 489th Engineer Battalion, Fort Leonard Wood, Missouri.

Outstanding Engineer Warrant Officer Award: Warrant Officer Three Nathan P.D. Harvel, 321st Engineer Detachment, 844th Engineer Battalion, Bethlehem, Georgia.

Sturgis Medal: Staff Sergeant Jay L. Kochuga, 336th Engineer Company, 463d Engineer Battalion, Youngwood, Pennsylvania.

Van Autreve Award: Specialist Ricky L. Weissend, 375th Engineer Company, 844th Engineer Battalion, Eva, Alabama.

Army National Guard

Itschner Award: Charlie Company, 201st Engineer Battalion, Kentucky Army National Guard, Cynthiana, Kentucky.

Outstanding Engineer Platoon Leader (Grizzly) Award: First Lieutenant Joseph W. Sloan, Charlie Company, 201st Engineer Battalion, Kentucky Army National Guard, Cynthiana, Kentucky.

Outstanding Engineer Warrant Officer Award: No nomination.

Sturgis Medal: Staff Sergeant Mark Welker, HHC, 1140th Engineer Battalion, Missouri Army National Guard, Cape Girardeau, Missouri.

Van Autreve Award: Specialist Daniel L. Macklin, 220th Engineer Company, Missouri Army National Guard, Festus, Missouri.

All of the nominees represented their major commands with the highest professionalism and dedication to the Engineer Corps's vision and deserve our highest praise. The award recipients were recognized at ENFORCE 2009 at Fort Leonard Wood, Missouri.

Building Great Engineers:
Creatively Mentoring Company Grade Officers

By Captain Robert R. Phillipson

The wars in Iraq and Afghanistan are often referred to as "company commanders' wars." Although some of these commanders are prepared for the challenges they will face in combat, others are not. We must have trained, capable engineer leaders in these positions to ensure our success. The Engineer Branch functions across the spectrum of Army operations, and as such we represent our branch to senior maneuver officers. An engineer's ability to analyze tactical problems and identify solutions can be a great asset to a brigade combat team (BCT) or battalion staff. A solid foundation in doctrine and tactics will lead to the employment of our young sappers to their full potential. So how do we best train and prepare company grade officers for their assigned duties and prepare them to interact with the maneuver leaders to provide them optimal engineer support?

Challenges

Young lieutenants and captains today face a number of challenges when arriving at their first company. For example, they probably will not get a fully-manned platoon or company or a property book with correct shortage annexes. Many of their subordinate leaders will have less than a month or two in their current grade or duty position. Within the first 90 days, some of those subordinate leaders will leave the Army or change stations. Critically, most of their subordinate leaders will be behind the normal timeline for the Noncommissioned Officer Education System, whether for the Warrior Leader Course, Basic Noncommissioned Officer Course, or Advanced Noncommissioned Officer Course. The company commander may have served in a construction battalion or held a job in the United States Army Corps of Engineers before being assigned to a heavy BCT and will face challenges understanding how to establish a training plan in preparation for combat. The United States Army's current operational tempo challenges leaders daily, and they find themselves struggling with time and resource management. Strategies to solve these problems come from cooperative interactions between leaders and subordinates and a calculated professional development plan on the part of raters and senior raters.

Effective Leadership

Some leaders are blessed with the charisma required to lead and influence sappers, while others require the support of their duty titles to accomplish these tasks. Observe leaders you serve with, adopt their positive traits, and try them within your own organizations. Encourage subordinate leaders to do the same. One of the reasons General of the Army George C. Marshall was a successful organizer and tactician was that he continuously applied different solutions to problems in a training environment

and optimized how the task was accomplished. His leaders gave him the flexibility to try new solutions to problems and learn from the results he achieved. His successes in expanding his capabilities were only achieved through time and a supportive chain of command. The larger share of coaching time should be devoted to the technical and tactical aspects of the profession of arms. Effective leadership results when subordinates have institutional knowledge and are unencumbered by the tactical and administrative aspects of their assigned positions. Also, since subordinates represent their organization when attached to maneuver units, it is critical that they understand how they are integrated into maneuver planning and execution.

"Officers must know how to think clearly about problems of the battlefield without being entangled with elaborate techniques of leadership to be effective."[1]

—General of the Army George C. Marshall

Commanders are responsible for training themselves and their subordinates in the challenging environment of military service. At the National Training Center, Fort Irwin, California, we see officers who are experienced combat veterans but cannot write a tactical order because many units use an abbreviated concept of operations format in combat. There are also those who try to lead their units by themselves because they do not feel they have the time to train subordinates on administrative skills. These officers are not as successful as those who have built a team. All leaders must continuously reflect on their competence in the art and science aspects of their profession, identifying their strengths and weaknesses and continuing their extended education.

"Developing leaders is a priority mission in command and organizations."[2]

—Field Manual (FM) 7-21.13, The Soldiers Guide

Reception and Integration

During the first interaction with new subordinate leaders, it is critical to establish required standards and performance measures. These leaders operate and integrate new information at different levels. One of the strengths of the military profession is that subordinate leaders are not identical—they are individuals. The initial counseling gives them very specific guidance, the commander's expectations of them, and what they should expect from the commander. This may sound basic but, in eight years of commissioned service, only one rater gave me a complete initial counseling. This, of all counseling, is probably the most critical. To help organize that first counseling session, the following can serve as primary categories:

Leadership

"An officer is responsible for everything his organization does or fails to do." That statement sets the tone a young leader needs to focus his or her perspective. Articulate the left and right limits (probably very narrow at first), and make it plain that development will bring greater latitude. Remind him or her of the obligation to respectfully provide input to decisions and encourage discussion with you. How many commanders have an "open door" whose threshold no one dares to cross?

"If as an officer one does not tell blunt truths or create an environment where candor is encouraged, then [he has done himself] and the institution a disservice."[3]

–Secretary of Defense Robert M. Gates

"An engineer's ability to analyze tactical problems and identify solutions can be a great asset to a brigade combat team or battalion staff."

Professional Ethics

A single unethical decision by a leader can do great damage to a unit and have strategic impact. The scandal at Abu Ghraib is a reminder that ethical failure by a small group can have disastrous consequences. Spend time talking with subordinates about the relationship between officers and noncommissioned officers (NCOs). Explain to young officers the importance of that cooperative relationship and how to approach the NCO who has a decade or more of military experience. The relationship between a platoon leader and platoon sergeant is different from the relationship between a commander and a first sergeant. Adjusting perspective does not always come naturally. The first meeting between a platoon leader and his platoon sergeant is not covered in any class during the Basic Officer Leadership Course. Raters and senior raters have a professional obligation to guide their subordinates to successfully navigate their first meeting with their NCOs. They should be armed with accurate assessments of the strengths and limitations of their future NCO partners.

Professional Development

Engineer officers' career paths can be quite diverse and offer little opportunity to specialize in any one field. An engineer may spend time as a lieutenant, operating a quarry as part of an engineer battalion, and time as a captain, rated by infantry officers while assigned to an infantry unit. Engineer officers need mentorship by field grade officers. Institutional course success is not always an indicator of performance or expertise. The first tactical order that I wrote as an infantry battalion planner was returned by my battalion commander with the comment, "This is an F." He then took the time to walk me through his

interpretation of a tactical order, and I began to realize the necessity of understanding how the commander visualizes the battlefield and processes information. For the next three years, with the help of my seniors, I learned as much as I could. The learning curve was steep and unforgiving.

Eight-Step Training Model. When first assessing a new officer, questions about doctrine and tactics should be posed to determine the officer's level of institutional knowledge. Then the officer should be assigned tasks that support his or her education and have an applicable outcome. The eight-step training model is a useful template; having a subordinate design ranges and produce the orders required to execute them is an effective training exercise. Not only does it require the officer to understand how to reserve the land, request the ammunition, arrange transportation, and organize support architecture, but it also requires research in Department of the Army Pamphlet 385-63, *Range Safety*, and understanding surface danger zones. Producing direct-fire control measures furthers understanding of the effects of weapon systems. Then the officer must work with NCOs to develop a comprehensive training plan—supported by doctrine—to meet the standards for executing a live-fire exercise. At the end of a single range design exercise, a baseline of knowledge is established or reinforced and the new officer knows the required standards for successful mission accomplishment. Young leaders may someday have an assignment independent of a company or battalion in combat.

"It took a long time to make senior officers realize that if they did not make junior officers go through the process in which they alone must make decisions or make recommendations on which decisions must be based, they hadn't done much."[4]

—General of the Army George C. Marshall

Doctrine. This is the foundation for all Army operations, and engineers will be asked to perform a variety of missions to the highest standards. An understanding of basic doctrine and how to apply the fundamentals to the decisionmaking process is essential. Develop a training plan in your subordinates' counseling to reinforce the troop-leading procedures. If a young leader is able to organize his thoughts within this system, it will enable effective time management. Also, understanding how to effectively use doctrinal terms is imperative. Subordinates should understand the need to become well versed in FM 1-02, *Operational Terms and Graphics*, and should not be allowed to speak in nondoctrinal terms. Speaking the language is a hallmark of credibility in the engineer profession.

History and Professional Writing. These have critical applications in professional development. The Army has a broad professional reading list that is challenging in its size and scope. Many of the books are mainstream and written before 1990. With current time limitations, topics worth studying should be specified. Ways to aid in identifying applicable texts are to seek the advice of senior leaders or to browse university courses about expected deployment locations and to scan their required reading lists. A timeline and structure for professional discussions should be established. Developing creative solutions to tactical problems requires that leaders have not only a solid base in doctrine but also in military history and professional writing.

Personal Development. It is critical for new leaders in our profession to look the part. Physical fitness is imperative. The first time a young officer is challenged by his subordinates is often at physical training when the young sappers try to determine the new leader's physical strengths and weaknesses. Poor performance there can be a challenge to the leader's credibility in other areas. Establishing goals and training plans for the new leader in terms of fitness should be part of initial counseling. In the same session, new leaders should be reminded that not looking the part can undermine professional credibility. Personal ethics must be part of this briefing as well, since an officer's personal life is always subject to scrutiny. Compromising ethical standards can result in a loss of professional credibility and effectiveness.

Basic Skills and Development. Counseling new officers quarterly is less than optimal, especially for junior lieutenants, who need to be counseled monthly. Counseling does not always have to be formal. Taking a knee with subordinates during a field training exercise is just as effective. Pick two or three traits to emphasize and concentrate on them. It is better to serve with a young officer who is an expert at a few things rather than one who is mediocre at many.

At the National Training Center, we see rotational companies ten times a year. Our team covers the full spectrum of engineer operations—from sapper companies to vertical construction companies. Fundamental skills often absent in junior officers are the ability to produce written orders to convey intent, understand how to supervise their platoon, and anticipate requirements. On the first point, without a company-level order, there is little chance that the platoon leader will generate his own. Commanders should be prepared to issue orders according to FM 5-0, *Army Planning and Orders Production*, from the first warning order to the final operations order. Enforcing this format will enable junior leaders to conduct troop-leading procedures with greater effectiveness and provide them a logical format to aid in parallel planning. The second point can be a sensitive topic. Young lieutenants and captains are also inexperienced leading in the positions they are assigned. There is often trepidation on their part to make decisions or give direction for fear of not knowing how to do it. Finally, young officers should be coached to anticipate requirements. This comes from a few months of working together, getting to know each other professionally, and understanding the commander's intent for small-unit operations in the operational environment.

Advanced Development and Sustainment. Once the initial training and coaching of subordinates is complete, commanders then have the obligation to prepare them

for their next duty position. Many lieutenants and junior captains are commanding companies without the benefit of having attended the Engineer Captains Career Course. When I attended that course, I thought the amount of time spent on staff operations was excessive—until I served on a battalion staff. Young leaders deserve to prove they can perform their duties and are prepared for future staff positions. Always holding subordinates to the highest standards ensures that they present themselves and the Engineer Branch in the best possible light.

Sustainment can simply be expressed as mentorship. This relationship can be established and maintained for many years to come. The military mentor relationship starts with initial counseling and continues throughout the careers of both officers.

Develop a Plan

Ineffective time management should not be allowed to drive our subordinate leader development plans. It is imperative to take the time to identify the strengths and weaknesses of subordinates, then develop a deliberate plan of action to prepare them for their path ahead. This is a commander's professional obligation, and young sappers deserve the best we can provide.

Captain Phillipson is Tarantula 15, Light Task Force Engineer Trainer (Airborne), Operations Group, National Training Center, Fort Irwin, California. Previous assignments include platoon leader and executive officer with the 577th Engineer Battalion; assistant plans and operations (S-3) officer, S-3 and task force engineer, and Commander, Headquarters and Headquarters Company, 2d Battalion, 7th Cavalry Regiment, 4th Heavy Brigade Combat Team (HBCT), 1st Cavalry Division; and Commander, Eagle Company, 4th Battalion, 6th Infantry Regiment, 4th HBCT, 1st Armored Division. He holds an associate's degree from the New Mexico Military Academy, Roswell, and a bachelor's from the University of New Mexico at Albuquerque.

Endnotes

[1]Forrest C. Pogue, *George C. Marshall: Education of a General*, 1880-1939, Viking Press, New York, New York, p. 250.

[2]Field Manual 7-21.13, *The Soldier's Guide*, 15 October 2003.

[3]Robert Gates, "Reflections on Leadership," *Parameters: US Army War College Quarterly*, Volume XXXVIII, Issue No. 2, Summer 2008, p. 11.

[4]Pogue, p. 100.

THE ENGINEER WRITER'S GUIDE

Engineer is a professional-development bulletin designed to provide a forum for exchanging information and ideas within the Army engineer community. We include articles by and about officers, enlisted Soldiers, warrant officers, Department of the Army civilian employees, and others. Writers may discuss training, current operations and exercises, doctrine, equipment, history, personal viewpoints, or other areas of general interest to engineers. Articles may share good ideas and lessons learned or explore better ways of doing things.

Articles should be concise, straightforward, and in the active voice. If they contain attributable information or quotations not referenced in the text, provide appropriate endnotes. Text length should not exceed 2,000 words (about eight double-spaced pages). Shorter after-action-type articles and reviews of books on engineer topics are also welcome.

Include photos (with captions) and/or line diagrams that illustrate information in the article. Please do not include illustrations or photos in the text; instead, send each of them as a separate file. Do not embed photos in PowerPoint®. If illustrations are in PowerPoint, avoid excessive use of color and shading. Save digital images at a resolution no lower than 200 dpi. Images copied from a website must be accompanied by copyright permission.

Provide a short paragraph that summarizes the content of the article. Also include a short biography, including your full name, rank, current unit, and job title; a list of your past assignments, experience, and education; your mailing address; and a fax number and commercial daytime telephone number.

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Junior Engineer Officers Get True Professional Development

By Captain L. Nicole Manteufel and Captain Jean D. Archer

The Afghanistan Engineer District (AED) of the United States Army Corps of Engineers (USACE) has partnered with Task Force Hammer, 62d Engineer Battalion (Combat) (Heavy), to implement an officer professional development program whose purpose is to exhibit broad-scale project management and retain quality company grade engineer officers by offering perspective on future Army opportunities. From February through April 2009, two-person engineer officer teams rotated through Kabul for three to five days to learn the workings of an engineer district. The teams met military and civilian staffs and learned about their various roles, visited projects in the Kabul area, attended meetings between project managers and contractors, and shadowed the district engineer commander. The goal was for each engineer officer to gain a better appreciation for project management and an awareness of opportunities within the highly diverse Engineer Regiment. Additional benefit came from interaction with professional engineers.

AED Mission

A recent trip with AED included two days of project site visits and one day of accompanying the commander. The in-brief established that the AED mission is to conduct project management, construction, and engineering in the Central Asian republic of Afghanistan to facilitate the establishment of a secure and stable environment while promoting reconstruction and infrastructure development. The multitude of AED projects varies widely in dollar value and scope, with a large percentage being the construction and operations and management of Afghan National Security Force (ANSF) complexes to support the spread of governance.

The first day of site visits included trips to observe construction at the Ministry of Defense in Kabul and inspect electrical upgrades at an Afghan National Army complex. The technical experience and professionalism that AED offers through the oversight and management of projects ensure a safe final product for the ANSF. The second day of site visits included tours of the Afghan National Military Academy (ANMA) and Kabul International Airport. The military academy, affectionately known as "East Point," was between classes and at the end of its "Beast Year" of especially intense training. AED had recently added three new ANMA cadet graduates as staff members in order to develop young Afghan officers. The stop at the airport included visits to the Afghan National Air Corps barracks, offices, and hangars. The AED had overseen their construction and now conducts operations and management there. All of these facilities and programs expand the capability of the ANSF, which validates AED's mission.

Shadowing the district engineer commander on the third day taught a lot about the workings of AED. The day included a meeting with a construction firm that has more than $100 million in contracts, and videoteleconferences with congressional staffers and students from the Maneuver Enhancement Brigade (MEB)/Brigade Special Troops Battalion (BSTB) Precommand Course at Fort Leonard Wood, Missouri. The day brought to light the immense

Cadets at the Afghan National Military Academy learn to march.

This Afghan depot was built with USACE oversight.

responsibility for construction that AED carries in rebuilding Afghanistan. For 2009, AED will have more than $4 billion in construction projects throughout Afghanistan, with a staff of just a few hundred personnel. The relationships that AED has with its contractors and diplomatic and military organizations are at the heart of building up the country's infrastructure and the ANSF, which will lead to a more stable and improved country.

Valuable Lessons

The experience taught that oversight in project management is an absolute necessity. AED has found a direct correlation between the amount of time AED quality assurance inspectors spend on-site and a contractor's quality of work and the timeliness of project completion. While U.S. troop construction projects normally are under the supervision of a platoon leader and platoon sergeant, many Commander's Emergency Response Program projects do not receive the same level of quality assurance attention, due to personnel and location limitations. Since quality assurance checks are a key part of ensuring that projects are done well, efforts should be made to train Afghan engineers to undertake this responsibility.

Another piece of information gained was the huge impact that long-lead items have on projects at all levels. Long-lead items are for a specific project that cannot easily be purchased on the local economy and must be shipped from outside the country, or which must be fabricated after an order is placed. AED project managers teach their contractors backward planning in order to finish projects on time. At the platoon and company level, the need for materials must be identified, and those materials must be diligently tracked to ensure the timely completion of projects.

The trip also revealed the future plans for water management in Afghanistan. In the past, proper studies were not conducted before the construction of dams, which resulted in the massive loss of usable farmland. Having learned from the U.S. government's failures in the 1950s to irrigate land with the Helmand Valley Authority, AED is conducting detailed studies before emplacing locks, dams, and new irrigation systems. Afghanistan needs a massive amount of water work, but it should start only after the proper data is collected. Hasty planning can yield unwanted results during execution.

In just three days, the AED officer professional development program succeeds in exposing junior officers to a critical mission and to efforts and programs they would otherwise never have known. It teaches lessons about the contracting process, the importance of project management—both by the contractor and by quality assurance officers—and the impact that AED has on the people of Afghanistan. The program has been a unique experience in which lieutenants and junior captains are able to visit multiple project sites and understand the role of AED and the opportunities other than troop-leading positions available to engineer officers to contribute to the counterinsurgency fight.

As Major General Gregg F. Martin, former United States Army Engineer School Commandant, stated, one of the greatest aspects of the Engineer Regiment is that it offers more options and transferrable skills than any other Army branch. Engineers can be anything from combat warriors to nation builders. The AED officer professional development program has embraced Task Force Hammer officers to show what great engineers can do.

Captain Manteufel has served as a platoon leader for Charlie Company, 62d Engineer Battalion (Combat) (Heavy) during the company's 15-month deployment to Afghanistan. She graduated from the United States Military Academy with a bachelor's in environmental science, then attended Basic Officer Leadership Course (BOLC) II at Fort Sill, Oklahoma, and BOLC III at Fort Leonard Wood. Upon her return to the states, she will attend the Engineer Captains Career Course at Fort Leonard Wood.

Captain Archer initially served as a platoon leader with Charlie Company, 62d Engineer Battalion (Combat) (Heavy) at Fort Hood, Texas. Upon the company's deployment to Afghanistan, she was reassigned as the company executive officer, where she has served since February 2008. She holds a bachelor's in civil engineering from the University of Florida, attended BOLC II at Fort Sill, and BOLC III at Fort Leonard Wood.

Mandatory Degrees for NCOs

By Major Dennis J. McGee

The original purpose of this article was to propose making college degrees a requirement for noncommissioned officers (NCOs), as it is for commissioned officers. However, research showed that there are already numerous programs to help Soldiers receive college credits to apply toward degrees. The focus now is to provide the critical resource of time for NCOs to get their degrees.

The United States Army has once again officially dedicated a year as the "Year of the Noncommissioned Officer (NCO)." In 1989, then Secretary of the Army John O. Marsh, Jr., along with Army Chief of Staff General Carl E. Vuono and Sergeant Major of the Army Julius W. Gates, declared the Army theme for 1989 as the "Year of the NCO." General Vuono viewed it as an opportunity to enhance the responsibilities and the status of the NCO Corps through programs that underscored the four enduring roles of the NCO: leader, trainer, role model, and standard-bearer. He authorized promotion of an additional 3,000 Soldiers to the grade of sergeant (E-5) during the last eight months of fiscal year 1989. Shortages in that grade accounted for more than 66 percent of all NCO vacancies. Approximately 60,000 of 202,000 specialists and corporals (E-4) were eligible to advance to sergeant. The Army estimated that a one percent increase in NCO operating strength caused a nearly two percent increase in the number of units reporting readiness ratings at or above their authorized level of organization. By his action, the chief of staff raised the NCO strength to nearly 276,000.[1]

There is no doubt that today's NCO Corps is unmatched anywhere in the world. The most frequently requested military-to-military security cooperation training program by other nations is for their NCOs to attend one of our NCO courses. Today's NCOs are also products of the world's best military education system. The NCO Education System (NCOES) runs the spectrum from entry level leader training at the Warrior Leader Course to the Sergeants Major Academy. Throughout the careers of all Soldiers, NCOs are required to pass through these gates in the NCOES. The courses are all well structured and designed according to a set standard of learning.

In addition to NCO academies, the Army has encouraged enlisted Soldiers to advance their education by other means. By 1952, the Army had developed the Army Education Program to allow Soldiers to attain credits for academic education. This program provided a number of ways for the enlisted Soldier to attain a high school or college diploma.[2]

Perhaps one of the biggest discriminators for promotion to the senior NCO ranks is the lack of a college degree. This has become even more important now as the Army has become greatly concerned with retaining midgrade NCOs. Like most professions, if there is no longer a chance of promotion, then many will choose to leave that career field and change jobs. On average, most NCOs have completed their first enlistment and are beyond four years of service. By that time, they have completed several military education courses, most of which are transferable as civilian education credits. The various programs offered by the Army Continuing Education System (ACES) permit Soldiers to take advantage of online colleges and universities that offer college credit for military training and education. Additionally, these post-secondary programs offer tuition assistance, flexible degree completion timelines, and civilian licensing or certification.[3]

The Department of Veteran Affairs administers the various Montgomery-GI Bill programs that provide funding for college courses. There are also other programs that assist Soldiers with associate and baccalaureate degree programs through accredited colleges and universities and provide credit for Army institutional schooling and professional credentialing or licensing, such as—

- Army University Access Online (eArmyU)
- College of the American Soldier (CAS)

- Servicemembers Opportunity Colleges–Army Degrees (SOCAD)
- Credentialing Opportunities Online (COOL)[4]

The challenge is finding the time to complete these degree requirements outside of the Army professional NCOES. NCOs who have college degrees have usually completed them on their own time, after duty hours, in deployed combat zones, or over many weekends, usually taking several years.

If the Army is serious about recognizing its professional NCO Corps, then it should provide the opportunity for NCOs to complete their degrees either during or following one of their NCOES courses. Ideally, Soldiers attending a Basic or Advanced NCO Course (BNCOC/ANCOC) should have the opportunity to complete their associate's or bachelor's degree. The current operational tempo causes many of today's leaders to be reluctant to release their NCO leaders to attend these schools. If the Army would make it mandatory for NCOs to complete college degrees, then this could serve as an impetus to force units to send NCOs to their respective NCOES courses on time. After, or in conjunction with, the course the NCOs could complete required college courses while on temporary duty away from the distractions of a unit, in an academic environment surrounded by their peers.

Another area of concern with mandatory degrees would be the types of degree required and whether they should be in any specific functional area. The Army has many examples of professionals who perform a trade but are not officially accredited or recognized by their profession or career field. As NCOs begin to take on leadership roles, they are placed in positions within the profession of arms that require them to be experts in their field or trade. For example, an engineer equipment operator must be trained and licensed just like a civilian crane operator; surveyors must be educated on how to properly use surveying instruments, just as a state-licensed surveyor is; and a prime power specialist must be qualified much like a certified electrical contractor. Another more generic comparison would be a company first sergeant who holds a bachelor's in human resources. The first sergeant will have already completed numerous NCOES courses and is responsible for running the day-to-day operations of a company of 75 to 150 Soldiers, equivalent to a medium-size business. Since these Soldiers are receiving education and training similar or identical to their civilian counterparts, they should be receiving the same state or national licensing or certification.

The Army Career Tracker program[5] is designed to bring together under one portal all the educational resources available to guide Soldiers along a career path or military occupational specialty. The advantages of having this program complementing the NCOES have yet to be realized, but the Army should do more. Specifically, the Army should make—

- An associate degree a requirement for promotion to staff sergeant.
- A bachelor's degree a requirement for promotion to master sergeant.
- Time available at BNCOC and ANCOC to complete these degrees.

As the Army focuses this year on its NCO Corps and continues to transform the NCOES, it should make strides similar to those that were made 20 years ago during the last "Year of the NCO."

Major McGee is an engineer officer attending the School of Advanced Military Studies at the United States Army Command and General Staff College. Previous assignments include brigade operations and training (S-3) officer, 130th Engineer Brigade; battalion S-3 officer, 84th Engineer Battalion; and Commander, Alpha Company, 249th Engineer Battalion (Prime Power), Fort Lewis, Washington.

Endnotes

[1]History, "2009–The Year of the Noncommissioned Officer," <*http://www.army.mil/yearofthenco/history5.html*>, accessed 12 May 2009.

[2]Ibid.

[3]United States Army Human Resource Command website, "Army Continuing Education Fact Sheet," <*https://www.hrc.army.mil/site/media/factsheets/aces.htm*>, accessed 12 May 2009.

[4]Credentialing Opportunities Online website, <*https://www.cool.army.mil/overview.htm*>, accessed 12 May 2009.

[5]Initiatives, "2009–The Year of the Noncommissioned Officer," <*http://www.army.mil/yearofthenco/initiatives1.html*>, website, accessed 12 May 2009.

Not a single one of us can afford to limp through our military life on the crutch of limited education…. Civilian education certainly enhances the individual's personal and professional value and especially the NCO's…. We aren't talking about an entry on a service record. We're talking about an individual acquiring more tools which will assist in daily living and certainly in the performance of military duties.

—SMA Leon L. Van Autreve, "Walking Tall—and Eager," Soldiers, February 1974, p. 33

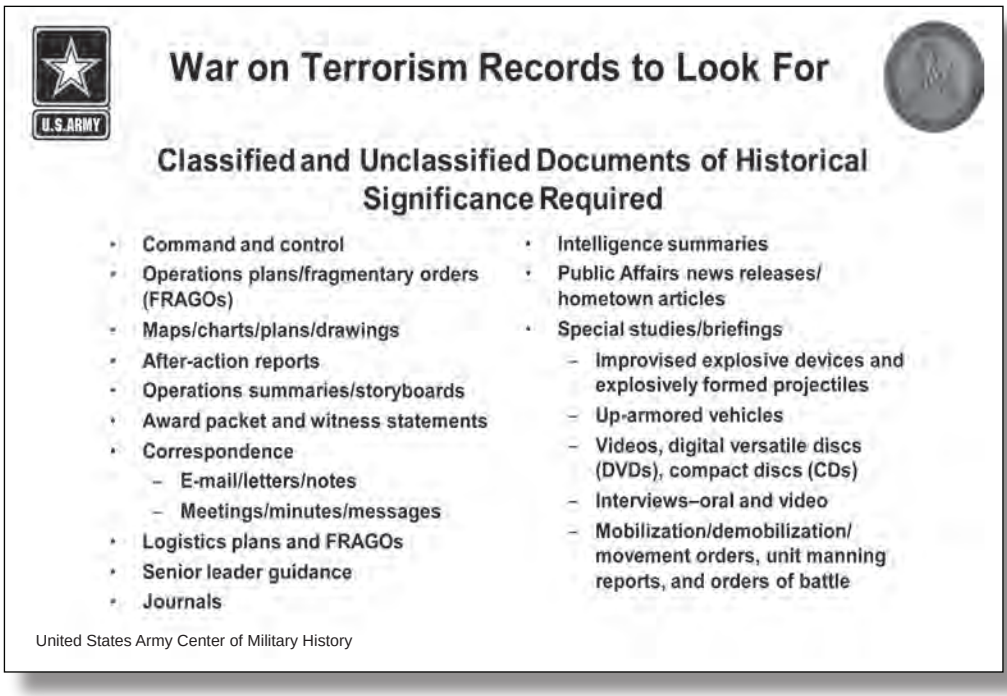
Army Seeks Records on War on Terrorism

By Lieutenant Colonel Robert G. Smith

An assessment of collected material has identified significant gaps in the United States Army Center of Military History records on the War on Terrorism. The list below identifies the specific types of electronic and other documents being sought to fill these gaps. There is a critical need to collect the classified and unclassified operational records relating to Operation Enduring Freedom and Operation Iraqi Freedom under the provisions of Army Regulation (AR) 870-5, *Military History: Responsibilities, Policies, and Procedures*, and Field Manual 1-20, *Military History Operations*.

While many records have been collected by deployed United States Army military history detachments and other military historians, the gaps have constrained efforts by historians to chronicle the Total Army's contributions to the war. In addition, processing veterans' claims of post-traumatic stress disorder and other medical claims is extremely time-consuming due to missing or incomplete records. To date, the Army's overall collection effort has focused primarily on Regular Army and Army National Guard brigade combat teams deployed to Iraq. Coverage of the activities of smaller National Guard and United States Army Reserve units during the War on Terrorism—especially in Operation Enduring Freedom—is sorely deficient. Also, the records being collected are considered permanent historical records that must be retired through the Army records management system according to AR 25-400-2, *The Army Records Information Management System (ARIMS)*.

The Army needs help to solve this deficiency. Rather than pass the entire burden on to Army commands, the Office of the Administrative Assistant to the Secretary of the Army has tasked the United States Army Records Management and Declassification Agency and the Center of Military History to work jointly to collect these operational records. The records of the Army staff, deployed units, and commands within the continental United States that provided critical support to warfighters from 11 September 2001 to the present fall within these collection efforts. Also, individual chronicles, oral interviews, or statements collected by United States Army Training and Doctrine Command units are to be considered records for the purpose of this effort. The records being collected by the Center of Military History will be considered permanent historical records that must be retired through ARIMS, according to AR 25-400-2. Although finished products are welcome, the Center is looking for raw operational records to capture in its War on Terrorism collection mission.



Unclassified documents and questions about handling classified materials should be sent to <*GWOT collect@conus.army.mil*>.

Lieutenant Colonel Smith is the Headquarters, Department of the Army, point of contact for the Center of Military History's War on Terrorism records collection effort.

Yokosuka Naval Base Prepares for Nuclear Aircraft Carrier

Photo by Catheren Gill

By Mr. Glenn T. Arakaki

Charting new waters in preparing Yokosuka Naval Base infrastructure for arrival of the *USS George Washington* (carrier vessel nuclear [CVN] 73)—the United States Navy's only nuclear aircraft carrier forward-deployed outside the United States—the United States Army Corps of Engineers (USACE) (Japan Engineer District), Naval Facilities Engineering Command (NAVFAC) Far East, and Puget Sound Naval Shipyard and Intermediate Maintenance Facility (PSNS & IMF) successfully executed a multimillion-dollar military construction (MILCON) program and related projects on a very tight and demanding schedule.

Bilateral Effort

To make Yokosuka Naval Base (about 60 miles south of Tokyo) ready for the aircraft carrier, the U.S. team undertook extensive MILCON facility and utility upgrades, and the government of Japan—under the host nation-funded construction (HNFC) program managed on the U.S. side by USACE—dredged more than 700,000 cubic meters of material from Truman Bay. A multiyear bilateral effort by the United States and the government of Japan assured that all technical, political, and environmental concerns were addressed in the planning, engineering, and construction.

The *USS George Washington* contributes to peace and stability in the Pacific and provides the United States 7th Fleet with greater range and strike capability. All systems were go when the aircraft carrier arrived at Berth 12 on 25 September 2008, replacing the *USS Kitty Hawk* (CV63)—the Navy's last conventionally powered aircraft carrier, which had departed Yokosuka on 28 May 2008, slated for decommissioning. Close cooperation between Japanese and American representatives at many levels overcame a variety of challenges during the forward deployment of the *USS George Washington*.

Planning and Preparation

Foremost and impacting all aspects of the program was the finite date established for the *USS George Washington*'s arrival. The date, driven by the passing of the *USS Kitty Hawk*'s 15-year service life extension after a 1987–1991 overhaul, put the project start on a tight schedule.

Projects supporting *USS George Washington* were built on a limited-size area of Yokosuka Naval Base.

Coming on the heels of international agreement between the United States and Japan, the construction necessary to replace the *USS Kitty Hawk* could not slip.

Photo by Daniel Fujimoto

Personnel from NAVFAC Far East and Japan Engineer District Yokosuka Resident Office test temporary electrical panels during a joint safety inspection.

The security classification for the arrival of the *USS George Washington* was problematic for the design process for the project designated P-998. The USACE Honolulu Engineer District selected the architect-engineering firm Parsons Corporation for its technical expertise and requisite workforce security clearances. Although cleared U.S. employees conducted design reviews, Japanese Master Labor Contract engineers working for the United States Navy and Japan Engineer District in Yokosuka, who were most familiar with existing utilities and infrastructure, were not able to review the Parsons P-998 plans until late in the design. This made it difficult to verify for interface checks or coordinate with ongoing major construction work at Berth 12 under a separate host nation project designed years earlier in support of the *USS Kitty Hawk*.

However, weekly in-progress reviews (IPRs) by a team of USACE, NAVFAC, and Naval Sea Systems Command (NAVSEA) engineers ensured that recently completed HN construction as-built conditions were integrated into the P-998 design. Project managers from each organization brought the right expertise—USACE on government of Japan host nation and MILCON design and construction, NAVFAC on naval base/berth/power construction, and NAVSEA on nuclear-powered ship requirements.

Imperative to success throughout the make-ready program was commander support that gave the effort priority. All commanders ensured that project delivery teams (PDTs) were resourced with personnel having the right skill sets and were empowered to get results.

Rapport and Coordination

The P-998 PDT, composed of representatives from the United States Army and Navy, the United States Forces Japan (USFJ), and the government of Japan, formed an interservice, international team. This created some unique relationships in the military engineering community. Although the Navy's capability as MILCON agent worldwide is renowned, USACE (in its role as the Department of Defense-designated construction agent for Japan) brought on NAVFAC Far East as a Japan Engineer District "customer" for P-998, while at the same time NAVFAC Far East executed other projects of its own related to the stationing of the carrier. PSNS & IMF, the subject matter expert for nuclear aircraft carrier support, provided a tremendous amount of specialized technical input during design and construction phases. This required intensive coordination by Japan Engineer District team members to determine if the technical input was within the scope of the project award and would require changes or other contractual actions.

These relationships called for the establishment of rapport between Army and Navy counterparts throughout all levels of the PDT. To achieve this, a senior engineer review group (SERG) consisting of senior leaders from Japan Engineer District, NAVFAC Far East, NAVSEA, Public Works Department (PWD), Commander Fleet Activities Yokosuka (CFAY), Ship Repair Facility (SRF), and PSNS & IMF met monthly to provide effective guidance and help facilitate resolution of critical issues.

Contracting and Funding

The Japan Engineer District executed three P-998 MILCON contracts with a program amount of $67 million.

Wharf Upgrades. The approximately $36 million wharf upgrades project provided one-of-a-kind systems never before constructed overseas for the operation and maintenance of nuclear aircraft carriers. The project retrofitted Yokosuka's Berth 12 utilities to include shore power, freeze seal air, and high-pressure air systems. Parsons completed the design for a facility used to produce grade A water through filtering, reverse osmosis, degasification, and demineralization processes. PSNS & IMF procured and installed the system downstream of the storage tanks to the distribution to the carrier, while the Japan Engineer District construction contractor Tokyu Construction Company, Ltd., was responsible for the remainder of

the looped system. The facility was constructed on Berth 12 after the demolition of 18,000 cubic meters of mountainside. Detailed coordination with PSNS & IMF was necessary throughout the planning, design, and construction. Due to the unique technology and site conditions, more than 60 contract changes were made for the wharf upgrade.

The project also retrofitted Berth 13 to provide "hotel" utilities by providing a potable water supply line, a wastewater forced main, and electrical distribution. Site conditions complicated the project; however, planners worked out an acceptable construction modification to meet the needs of the customer.

Berth 10/11, for the nuclear aircraft carrier maintenance barge, was constructed along an existing seawall near Berth 12. The Japan Engineer District worked with government of Japan and United States Navy entities to determine ownership and proper custody and disposal of a preexisting pontoon and executed its safe removal for nominal cost, ensuring that construction could begin in time to meet the tight schedule. Berth 10/11 is unique to the Navy for maintenance barge berthing.

The P-998 wharf upgrades, started 30 May 2006, was the largest MILCON executed by USACE for the United States Navy in Japan and the first such MILCON for Japan's second largest construction contractor, Tokyu. The construction contract was completed 6 June 2008.

Power Upgrades. This contract built a new switchgear facility for the Yokosuka Naval Base to expand the existing 60-hertz power grid. The $22 million design-build project was awarded February 2007 to Japan's largest construction contractor, Obayashi Corporation. The Japan Engineer District and the Honolulu District Regional Technical Center worked collaboratively to see the project to a 7 August 2008 contract completion. Not all challenges were technical, however. Some equipment, such as the 4.5 megavolt-ampere (MVA) frequency converter and 15 MVA synchronous condenser, were of American manufacture, causing complications for the Japanese contractor in controlling major equipment deliveries, due to export requirements.

The project installed digital supervisory controls and data acquisition (SCADA) equipment for collecting and displaying real-time operational data to the power system operators. The SCADA system encompasses a central control station, a high-bandwidth fiber distribution network and 60 intelligent remote devices that provide system parameters every two seconds, process data, and respond immediately to control signals. The new SCADA system occupies less than 10 percent of the space of the base's existing system and provides the memory capacity and expansion capability to replace it.

Power to the switchgear is provided by the existing switchgear facility at Yokosuka Naval Base and by an adjacent plant that contains three 5,820-kilowatt gas engines and a 7,200-kilowatt gas turbine for 60-hertz electrical power and steam service to shore and ship areas. Limited confines created a constantly conflicting workspace environment and necessitated daily coordination between the two projects.

Building Addition. The Japan Engineer District awarded the contract for the Building 3128 second floor addition in May 2006 to a third contractor, Ichibo Corporation, a relatively small but experienced firm that has completed U.S.-funded work across Japan. The new second floor, a $2.5 million project, houses the Commander, Submarine Group Seven (COMSUBGRU-7), command structure and was the first project finished, with construction completed in June 2007.

Photo by Yoshio Noji

Medium-voltage cabling is supported by new cable trays in a Yokosuka Naval Base utility tunnel.

Dredging Truman Bay

In addition to MILCON, the Japan Engineer District also provided construction management services consisting of engineering and construction surveillance for the host nation Facilities Improvement Program (FIP) project NA-027, Dredging of Truman Bay. The project included the dredging of Berths 8/9 and 12 and the adjacent turning basin to a depth of 15.24 meters to support movements of the *USS George Washington*. Work also included the removal and reinstallation of several buoys and their concrete moorings.

Photo by Shizuo Yoshimura

Yokosuka Naval Base Ship Repair Facility personnel connect maintenance barge spud mooring collars to piles at the new seawall.

Planners ensured that the contractor under a government of Japan contract acquired a dredge permit from the Yokosuka Port Authority and erected silt screen fences required by the city of Yokosuka. The Ministry of Environment issued a dumping permit; however, daily quantity was limited for disposal within a joint U.S. military and Japan Self-Defense Forces training area approximately 150 kilometers to the south. Additionally, the Ministry of Defense and South Kanto Defense Bureau (SKDB) worked for months to reach agreement with protestors and the Chiba fishermen's association over the project.

Although the dredge plan appeared simple, execution was complicated by ship movements, Japan Engineer District and Navy contractor activities, and bad weather. Japan Engineer District held weekly coordination meetings to resolve complex scheduling issues and to enact solutions that included night dredging, doubling the dredge fleet, increasing the number of transport ships, and coordinating the continuous reestablishment of silt screen fence boundaries. The Commander, United States Naval Forces, Japan, worked closely with the director of the SKDB to ensure that the project stayed on schedule. In dredging from 10 August 2007 through 3 August 2008, the project relocated more than 700,000 cubic meters of material.

Safety First

The projects achieved outstanding safety records—282,914 contact man-hours for the wharf upgrade and 114,660 contact man-hours for the power upgrade—with no recordable lost-time accidents. Japan Engineer District conducted safety oversight and established mentoring/capacity development relationships with the contractors. Japan Engineer District and NAVFAC funded Japanese translation of Engineer Manual (EM) 385-1-1, *Safety and Health Requirements*, to ensure that Japanese contractors had a clear understanding. Despite the challenges presented by language and cultural differences, industry practices, and variance in U.S. and Japanese safety regulations, the following helped ensure accident prevention and awareness:

- Effective use of composite risk management principles
- Preparatory safety meetings
- Management staff safety surveillance
- Routine joint safety inspections
- Daily contractor safety tool box meetings
- Proactive quality assurance representatives and contractor safety and occupational health officers
- The mindset that "Everyone is a Safety Officer"

The final result in this complex, multicontract project was on-time and within-budget delivery of shore-to-ship support systems for the *USS George Washington*.

Mr. Arakaki is the Chief, Navy/Marine Corps Branch, Programs and Project Management Division, Japan Engineer District, United States Army Corps of Engineers. He holds a bachelor's in mechanical engineering from California State Polytechnic University, San Luis Obispo.

Note: On 10 July 2009, USACE announced that the Japan District PDT for the Navy MILCON Project P-998 Wharf Upgrade, Power Upgrade, Building 3128 Addition, and the Host Nation Project Dredge Truman Bay won the 2009 USACE PDT of the Year Honors Award. USACE commended the PDT for "completing the project and associated facilities well below the USACE metrics for cost and time growth. The PDT coordinated a highly complex program with several U.S. Navy organizations, the U.S. Forces Japan and, most important, with the Host Nation of Japan."

Restoration of Davids Island

By Dr. JoAnne Castagna

Photo courtesy United States Army Corps of Engineers

Decaying homes with blown-out windows, overgrown grass on lawns, and 1950s vintage cars parked in dilapidated garages. That was the scene at Davids Island—more like the surreal landscape in a disaster movie, as if the residents of this little village just picked up and left. This aptly describes the abandoned remains of Fort Slocum, a former United States military base that at one time occupied Davids Island, an uninhabited 80-acre piece of property located in the Long Island Sound, one-half mile off the shore of New Rochelle, New York.

In December 2008, the United States Army Corps of Engineers completed its work at the site (begun in 2005) of demolishing and removing 93 decaying structures, thereby creating open space. This work was performed at the request of the Office of Economic Adjustment and the city of New Rochelle, the island's owner, who plans to revive it and make it accessible for public use.

Military Chronicle

In 1867, Fort Slocum was established on the island where a Civil War hospital once stood, and in over a century the fort has reappeared in various military incarnations. The active post was used for several years by the United States Air Force and has served as a military hospital, an artillery mortar battery, and a training post. Fort Slocum was a staging area for troops heading overseas during the two world wars, and during World War II was the most active recruitment center in the United States.

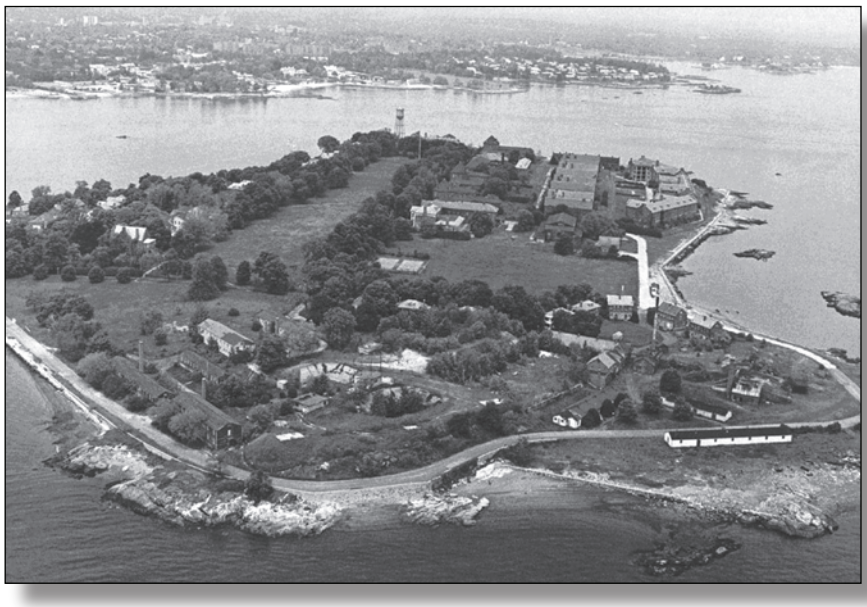


Photo courtesy Fort Slocum Alumni and Friends Collection

Oblique aerial photograph of Fort Slocum, 15 November 1961

The fort's last military incarnation was as a missile command base in the 1960s. Since then, the island has lain dormant, and the public has been denied access. However, Davids Island has been eyed as a possible location for a power plant. In addition, the sanctuary's wide variety of marine life and birds and more than a mile of beach have made it tempting for real estate mogul Donald Trump to consider placing luxury condos on its shores. For whatever purpose is decided for the island, the Corps has made the site clean and safe for the public while also preserving the area's wildlife—which includes threatened animal species—and its rich military history.

Ecological and Historical Concerns

In more recent years, Davids Island has been considered as a location for a public park and nature preserve. In New York State, the osprey is considered a "species of concern," which means the bird's population has declined in the past and is making a slow recovery. The first task the project team performed before beginning any demolition was to move a large osprey family nest inland from the island's pier in order to protect it from the construction.

The project might seem an easy one—demolishing buildings with a standard complement of the right equipment. But more than that, there was great interest to preserve some of the rich history of the island. The Corps understood this and, as in many times past, came up with a variety of solutions to support the historical aspects of the project. Extensive research was performed on each of the island's 93 structures, which were of varying military architectural styles.

This research included digging up historical data, taking photos, and performing archeological studies. About one-third of the structures were identified as having historical or archeological significance and, if desired, could be restored or partially restored. After research was completed on each of the buildings, the structures were demolished if they were determined not restorable. In this way, construction and historical preservation efforts worked in tandem to move the project forward without wasting time and money.

Demolition or Preservation

Last fall, one of the key structures on the island was demolished, marking the near completion of the project. The island's large water tower that has been a sailing "landmark" for more than 78 years, and which marks the edge of the island, was brought down. Much of the material waste from the demolition that included a large amount of steel is being recycled, especially from the water tower. Hazardous materials, such as asbestos, are being removed and brought to licensed facilities.

The Corps worked with a number of interested parties from Westchester County and the city of New Rochelle to determine what should be done with those historic structures that could be preserved. City officials decided to not restore any of the island's structures to avoid funding their maintenance before the use of the island is determined.

Photo courtesy Tetra Tech EC, Inc.

Drill Hall/gymnasium, built in 1909

However, remnants of the former fort will be preserved on the island for the public to view, including the fort's overall landscaped vegetation, a seawall, the flagpole, mortar pits from the late nineteenth century, tennis courts, walkways, and a cannon used during the Spanish-American War.

Summary

To enable the public to find out more about these historic items—as well as other aspects of the fort—the Corps, the Westchester County Historical Society, and the New Rochelle Public Library are collaborating to create a virtual archive and public exhibit that will be viewable on the Internet. This virtual archive and exhibit will include all of the extensive research the Corps gathered during this project, in both print and audio formats, including the historical data on each of the fort's structures, photos, maps, videos, and oral histories from more than two dozen individuals who used to live and work at Fort Slocum. In addition, various museums will include the Corps reports in their archives.

The future of the island is still undecided, but what is certain is that what has primarily been a wildlife sanctuary will soon be accessible to the public. And speaking of wildlife, the osprey family—whose nest had to be moved at the beginning of this project—has since grown threefold. Maybe this signifies an adaptable and prosperous future for Davids Island.

Dr. Castagna is a technical writer-editor for the United States Army Corps of Engineers, New York District. She can be reached at <joanne.castagna@usace.army.mil>.

ENGINEER DOCTRINE UPDATE

U.S. Army Maneuver Support Center
Training and Doctrine Development Department
Doctrine Division, Engineer Branch

Publications Currently Under Revision

Publication Number	Title	Date	Description (and Current Status)
FM 3-34	*Engineer Operations*	Jan 04	This is the engineer keystone manual. It encompasses all engineer doctrine; integrates the three engineer functions of combat, general, and geospatial engineering; and addresses engineer operations across the entire spectrum of operations. **Status:** Published.
Organizational Manuals			
FM 3-34.22 (FM 3-34.221) (FM 5-71-2) (FM 5-71-3) (FM 5-7-30)	*Engineer Operations –Brigade Combat Team and Below*	Pending (Jan 05) (Jun 96) (Oct 95) (Dec 94)	This new manual will encompass engineer operations in support of brigade combat teams (BCTs) (heavy, infantry, and Stryker–the armored cavalry regiment) and their primary subordinate units (infantry battalion, Stryker battalion, combined arms battalion, and the reconnaissance squadron). This manual will supersede FM 3-34.221, FM 5-7-30, FM 5-71-2, and FM 5-71-3. **Status:** Published February 2009. To be consolidated into FM 3-34 in 4QFY10.
FM 3-34.23 (FM 5-116) (FM 5-100-15) (FM 5-71-100)	*Engineer Operations –Echelons Above Brigade Combat Team*	Pending (Feb 99) (Jun 95) (Apr 93)	This is a new manual that will encompass engineer operations in support of all engineer operations above the BCTs (division, corps, and theater). The intent is to consolidate and revise three engineer FMs that provide doctrinal guidance for the entire spectrum of engineer operations supporting echelons above the BCT level. This manual will supersede FM 5-71-100, FM 5-100-15, and FM 5-116. **Status:** To be published in 4QFY09. To be consolidated into FM 3-34 in 4QFY10.
Combat Engineering			
FM 3-90.11 (FM 3-34.2)	*Combined Arms Mobility Operations*	Aug 00	This is a full revision, to include renaming and renumbering of FM 3-34.2, *Combined Arms Breaching Operations*. Changes in the force structure have required adjustment of the tactics, techniques, and procedures (TTP) associated with breaching and clearance operations. The United States Marine Corps (USMC) plans to adopt this manual as well. **Status:** To be published in 4QFY10.
FM 3-90.13 (FM 5-102) (FM 90-7)	*Combined Arms Obstacle Integration*	Pending (Sept 94) (Mar 85)	This revised manual will contain the basic fundamentals associated with countermobility operations and will incorporate aspects of the contemporary operating environment (COE) and full spectrum operations, along with emerging doctrine on networked munitions. **Status:** On hold for release of FM 3-90, *Tactics*.
FM 3-34.300 (FM 5-103)	*Survivability*	Jun 85	This manual provides survivability information needed by commanders and staffs at the tactical level. It includes guidance on integrating survivability into planning and orders production and creation of the engineer running estimate. It provides examples of a survivability capabilities card, matrix, and timeline to assist with the planning, revision, and conduct of specific survivability tasks. The USMC plans to adopt this manual as well. **Status:** On hold; no rewrite date projected.
FM 3-34.400 (FM 5-104)	*General Engineering*	Nov 86	This manual describes the operational environment (OE) and how to apply and integrate general engineering principles in support of full spectrum operations. It focuses on the establishment and maintenance of lines of communication and engineer support to sustainment operations throughout the area of operations. Although not designated as a multi-Service publication, it is intended to inform all Service components of the types of general engineering tasks, planning considerations, the variety of units available to perform them, and the capabilities of Army engineers to accomplish them. The USMC designation will be added to this manual. **Status:** Published 9 December 2008.

ENGINEER DOCTRINE UPDATE

U.S. Army Maneuver Support Center
Training and Doctrine Development Department
Doctrine Division, Engineer Branch

Publication Number	Title	Date	Description (and Current Status)
General Engineering			
FM 3-34.410 Volumes I & II (FM 5-430-00-1 & 5-430-00-2)	*Design of Theater of Operations Roads, Airfields, and Helipads*	Aug 94; Sep 94	This manual will serve as a reference for engineer planners in support of joint and theater operations (TO) in the design of roads, airfields, and helipads. It is currently dual-designated with the Air Force. The Air Force (as well as the Navy and USMC) plans to adopt the new manual also. **Status:** Pending completion of drainage chapter.
FM 3-34.451 (FM 5-472)	*Materials Testing*	Dec 92	This manual will provide technical information for obtaining samples and performing engineering tests and calculations on soils, bituminous paving mixtures, and concrete. For use in military construction. The test procedures and terminology will conform to the latest methods and specifications of the American Society for Testing and Materials (ASTM), the American Concrete Institute (ACI), and the Portland Cement Association (PCA), with alternate field testing methods and sampling techniques when complete lab facilities are unavailable or impractical to use. The USMC plans to adopt this manual as well. **Status:** Preparing final approved draft: to be published in 1QFY10.
FM 3-34.465 (FM 3-34.465 & FM 3-34.468)	*Quarry Operations*	Mar 05; Dec 03 (Apr 94)	This manual outlines the methods and procedures used in the exploration for and operation of pits and quarries. It provides information on equipment required for operating pits and quarries and for supplying crushed mineral products, but does not cover the operation of the stated types of equipment. This is a collaborative effort with the Navy and Air Force and includes the newest technologies and current practices. **Status:** Preparing Volume II. Initial draft staffing of both volumes in 1QFY10.
FM 3-34.469 (FM 5-484)	*Multi-Service Well Drilling Operations*	Mar 94	This manual is a guide for planning, designing, and drilling wells. It focuses on techniques and procedures for installing wells and includes expedient methods for digging shallow water wells, such as hand-dug wells. This collaborative effort with the Navy, Air Force, and USMC includes the newest technologies, current practices, and revised formulas. **Status:** Estimated date for posting to Army Knowledge Online (AKO) is 4QFY09.
FM 3-34.485 (FM 5-415)	*Firefighting Operations*	Feb 99	This manual gives directions on deploying and using engineer firefighting teams. These teams provide fire prevention/protection, aircraft crash/rescue, natural cover, and hazardous material (HAZMAT) (incident) responses within a TO. This is a parallel effort with the revision of the firefighting Army regulation (AR) to bring both policy and doctrine current with required certifications, newest technologies, and current practices. **Status:** Initiating the program directive and developing the initial draft.
FM 3-34.500 (FM 3-100.4)	*Environmental Considerations in Military Operations*	Jun 00	This manual provides environmental protection procedures during all types of operations. It states the purposes of military environmental protection, a description of legal requirements, and a summary of current military programs. It also describes how to apply risk management methods to identify actions that may harm the environment and appropriate steps to prevent or mitigate damage. **Status:** Estimated date for posting to AKO is 4QFY09.
Geospatial Engineering			
FM 3-34.600 (FM 3-34-230)	*Geospatial Operations*	3 Aug 00	This full revision of FM 3-34.230, *Geospatial Operations*, will incorporate changes as a result of FM 3-34, *Engineer Operations*, and FM 3-0, *Operations*. Geospatial engineering consists of engineer capabilities and activities that contribute to a clear understanding of the physical environment by providing geospatial information and service to commanders and staffs. **Status:** Estimated date for posting to AKO is 1QFY10.

NOTEs: Current engineer publications can be accessed and downloaded in electronic format from the Reimer Digital Library at <*http://www.adtdl.army.mil*> or the MSKN website at <*https://www.us.army.mil/suite/page/500629*>. The manuals discussed in this article are currently under development. Drafts may be obtained during the staffing process or by contacting the engineer doctrine branch at: Commercial 573-563-0003, DSN 676-0003, or <*douglas.merrill@us.army.mil*>. The development status of these manuals was current as of 10 February 2009.

Engineer Skills Development Workshop

By Captain Sharmistha Mohapatra

The Engineer Skills Development Workshop (ESDW), a Commander's Emergency Response Program (CERP)-funded training and education initiative, is founded on an Afghan-American partnership that is developing a skilled construction workforce capacity in one of Afghanistan's most remote provinces. Of the nearly 400,000 people who live in the province, 99 percent live in rural districts with minimal exposure to skills enhancement opportunities. Half of the province is mountainous, and the eastern side borders the hinterlands of Pakistan. This geography explains why the region is accessible to insurgent forces that run intimidation and recruiting campaigns among the population. To counteract their influence, the government of the Islamic Republic of Afghanistan aims to bring development to its citizens in the forms of infrastructure improvements and educational opportunities.

Conception

The Afghan Skilled Labor Academy, simply called the Winter Workshop, was executed first by Task Force Pacemaker, 864th Engineer Battalion (Combat) (Heavy), and the provincial reconstruction team (PRT) in February 2006. It was conducted in the winter when the construction tempo was low, allowing Soldiers to serve as instructors. The immediate purpose was to teach Afghan contractors and their laborers construction skills in carpentry and masonry. The Task Force

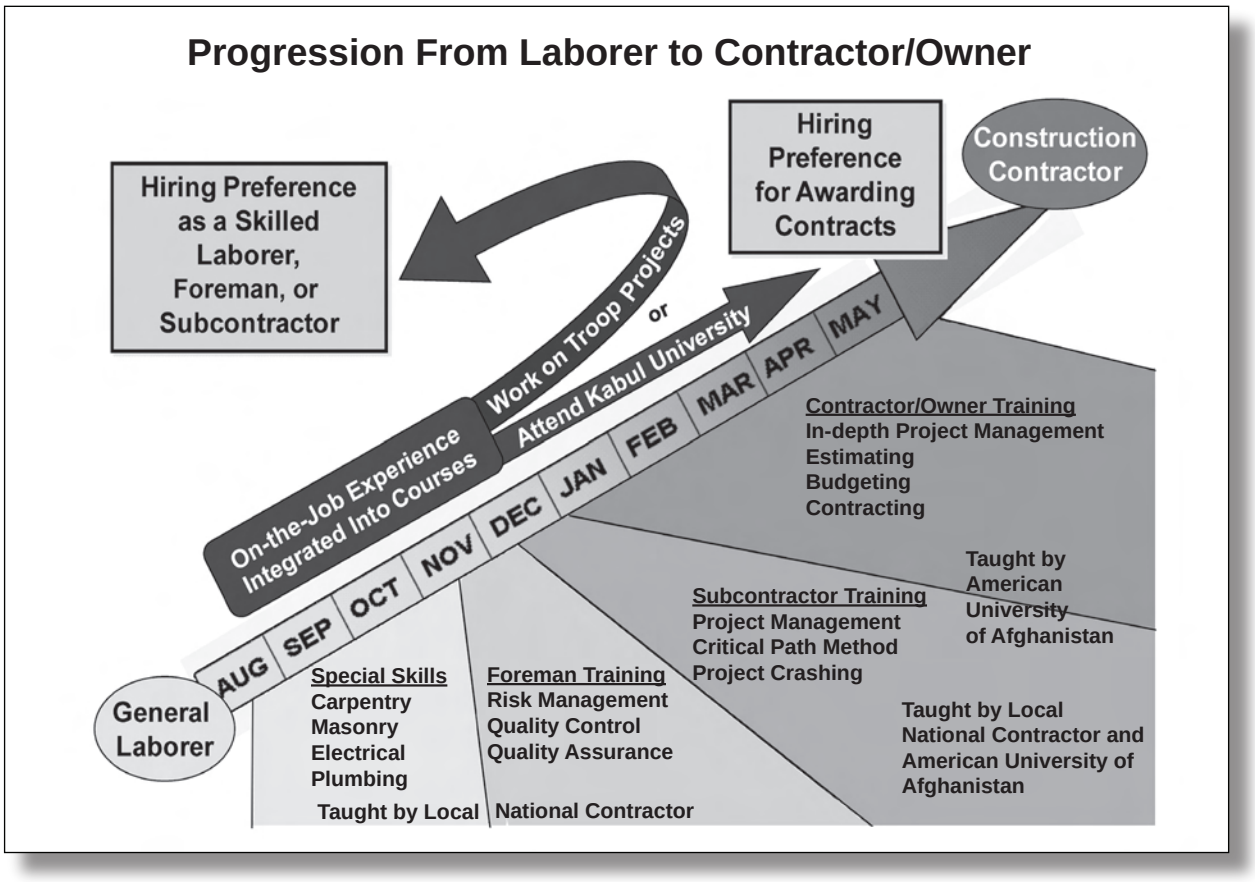


Figure 1

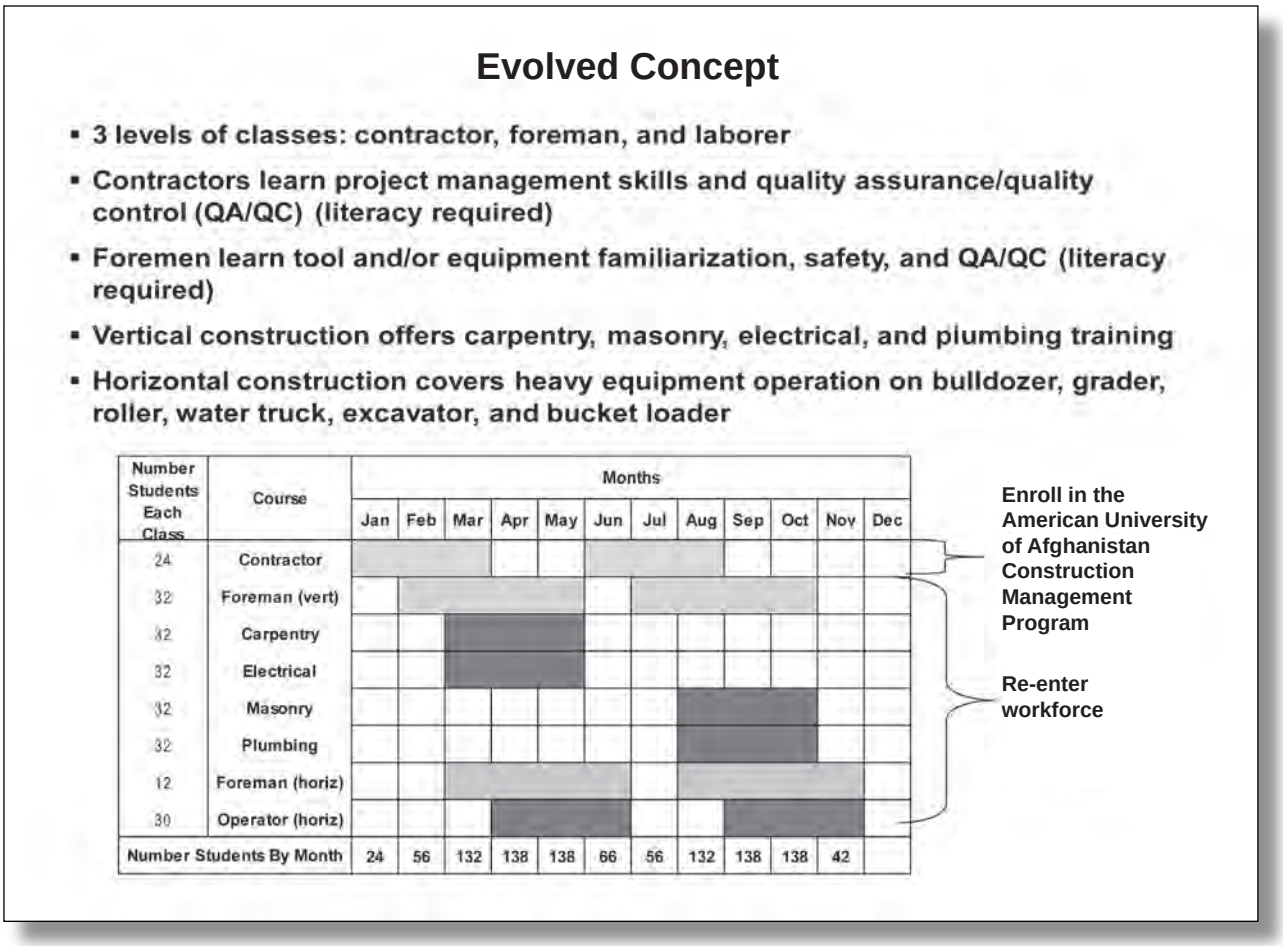


Figure 2

Pacemaker engineer leadership, having received insight from visiting jobsites and talking to contractors, developed the curriculum for the original Winter Workshop using as a template a course taught at Gulfport, Mississippi. The PRT facilitated the local government advertisement and press coverage while the provincial engineer was responsible for civilian enrollment. A contractor provided CERP-funded billeting, food, transportation, tools, and materials for the students. Total expenses came to $198,500.

The planning committee decided to start with a 40-hour, 7-day workshop. Ten Afghan National Army engineers attended a practice training session, giving the U.S. military instructors time to rehearse and amend the curriculum. For the workshop itself, 63 civilian contractors and laborers enrolled. For the first 3 days, students built wooden guard shacks; for the last 3 days, they placed a concrete slab and constructed a short masonry wall. During the classroom training, contractor students shared their business experiences and practices, to include contract reading, quality control, and quality assurance. Though brief, the discussion proved that students thirsted for knowledge of the construction business. Graduation was held on the seventh day, with graduates receiving certificates of completion from local Afghan government officials. The students also were presented with their tools to give them an advantage in securing employment.

This first workshop served as a base from which advanced workshops could be developed and exported to other regions throughout Afghanistan. During the first quarter of 2008, Task Force Pacemaker, on its second Operation Enduring Freedom tour, took the next step to spread this initiative. It conducted 1-week workshops at forward operating bases (FOBs) in two regional provinces, training more than 180 Afghans. At one FOB, 25 students went on to gain employment on the base. While contractors provided the logistical support for the training, there remained heavy United States Army involvement in coordinating the instruction and administration of the program. Total expenses came to $540,000.

Advanced Development

In May 2008, Task Force Hammer, 62d Engineer Battalion, began to amplify the efforts of Task Force Pacemaker by planning for a year-round program with additional construction subjects taught in a three-tiered, progressive approach. The new curriculum—the ESDW—consisted of four vertical construction courses in the first tier:

- 10 days of carpentry training
- 15 days of masonry training

- 12 days of electrical training
- 8 days of plumbing training

After completing the first tier of laborer training, exceptional students could move up to the second tier with 14 days of foreman training, then to the third tier with 10 days of subcontractor training. A fourth tier, yet to be developed, will provide university-level construction management training for contractors.

Each laborer class covered the fundamentals of construction, including safety practices and international building standards. Students received hands-on training on projects such as constructing a hut, placing a concrete pad, wiring an electrical system, or installing a water basin. Students exhibiting higher aptitudes were recommended by the course's Afghan technical director to pursue the foreman course, which starts with practical laborer construction skills and then advances to materials estimation, risk management, and quality control. Finally, the subcontractor course emphasizes project management for those seeking, or already working in, supervisory positions. Each course was planned not to exceed 2 weeks so that graduates could return to the workforce quickly, minimizing disruption to their wage-earning potential. Despite losing 8 to 15 days of wages, the benefit of attending a course yielded workers with higher earning power as semiskilled laborers.

To execute this design full-time, the civil-military operations (CMO) section had to overcome resource restrictions. Because troops were unavailable as instructors and only two people were in the section, CMO hired nine trilingual Afghan engineers as the primary instructors of the training. These men were employed by the same contractor who provided the materials and tools for the workshops. In August, the section ran a 2-week train-the-trainer session to prepare the instructors to lead their own classes in technical and administrative faculties. Members of the CMO section realized that shifting from a military-led to an Afghan-led program would be beneficial for several reasons. It would minimize language and cultural barriers between students and instructors and give students educated role models from among their own countrymen. Putting the training onus on the Afghan instructors would also force the staff to implement their own chain of command and develop their own leadership skills. In the long run, this model would ease the transition to total autonomy.

To maximize government involvement, the provincial governor reviewed and approved the training initiative and delegated advertisement and student recruitment to his director of social work and labor. This director was responsible for passing on the compiled list of students to the contracted all-Afghan instructor team, which then provided students with free lodging, food, transportation, take-home safety equipment and tools, materials, and invaluable training for the duration of the course.

From September 2008 through February 2009, vertical construction training took place on an FOB to provide a secure training site and to allow the CMO section to provide constant technical and administrative guidance to the ESDW staff. During this time, the staff conducted one masonry, one electrical, one plumbing, one foreman, one contractor (revised from being called subcontractor), and two carpentry classes. In after-action reviews, students surprisingly commented that they wanted longer courses with more exposure to practical construction. They recommended teaching additional subjects such as furniture making, insulation installation, generator repair, shower installation, steelwork, and materials testing.

From October through November 2008, a second contract executed the horizontal ESDW. This training took place both on and off the FOB, led by a technical director-engineer and 11 skilled operator-instructors. The students spent 11 days learning to operate heavy equipment, including bulldozers, graders, rollers, water trucks, and bucket loaders. Then they spent 5 days on a capstone road project for the local bazaar. The ensuing foreman class ran for 15 days, executing road and land upgrades around the city. Combining construction training with urban development projects spurred the idea of including this practice in the vertical ESDW as well. This benefited the city and gave students a sense of civic pride. A downside to the horizontal ESDW was that because of poor recruitment efforts, only 22 students arrived to fill the 42 allotted slots. For the ensuing courses, Task Force Hammer got the word out on the provincial radio station. As time progressed, this enrollment method was successful and the coordination responsibility was passed on to the contractors.

It became apparent that the vertical engineering instructors, though technically savvy, lacked sufficient practical construction experience. In January 2009—at the instructors' request—the CMO section augmented the training team with skilled workers from each trade. Henceforth, each engineer was paired with a tradesman in a relationship analogous to a platoon leader and platoon sergeant. After integrating the new staff (to include a second technical director), it became the natural course of action to divide the instructors and execute two simultaneous skilled-trade courses. This maintained an ideal ratio of one instructor to four students and generated geometric growth in the ESDW program.

In February, the officer in charge of the Task Force Hammer CMO met with a representative from the United States Agency for International Development (USAID) to exchange information about the ESDW program and another training center, which offers 3-month classes in construction skills. The Task Force Hammer officer came away with instructional material needed for lengthening classes, and the USAID advisor came away with the tiered-training model of skills development. Back at the FOB, the vertical workshop engineers incorporated the new material into their existing training plan and identified civic projects for practical training. The new program, scheduled to go into effect in June, implemented a reverse tiered-training approach. Instead of conducting separate classes that progressed from laborer to foreman to contractor, the class was

a semester-long collaborative effort, with students interacting as they would in real-world projects.

In the midst of planning curriculum changes, the vertical ESDW reached a critical milestone during April—the movement of the training site from the FOB into the provincial capital. The provincial director of tribal affairs volunteered his compound for classroom space in exchange for an upgrade of his grounds and buildings. This move allowed greater accessibility to the population, which otherwise would have been afraid to come onto the FOB. In addition, the physical transition signified a crucial step that the ESDW instructors took toward autonomy.

During this time, Task Force Storm, 168th Engineer Brigade, obtained the Green Machine, an apparatus for making bricks from compressed earth. This novel technology uses natural soil mixed with a minimal amount of cement to produce interlocking bricks that do not require mortar. The spring masonry class experimented with this machine, using the bricks to construct a test building for the tribal affairs compound. Time will tell how these bricks fare in Afghanistan and whether their use will be a viable alternative construction method in an earthquake zone.

April also marked the beginning of the second round of horizontal workshops. The contract implemented the reverse-tiered, semester program with the first 21 days dedicated to foreman training, followed by 66 days of joint foreman and operator collaboration. Equipment familiarization took place on the FOB for the first month and the practical roadwork projects began in June. The contractor's design engineer had met with the local mayor to identify and prioritize horizontal projects, to include road upgrades for the bazaar and earthwork for a future subdivision.

Statistics

As of 13 June 2009, the ESDW had graduated 247 Afghans and presented a total of 299 certificates, including the students who returned for additional courses. The ages of students ranged from 15 to 60 years, with an average of 20.2 years. Graduates had an average of 9 years in the workforce but only 3 years of formal schooling. Only 40 percent of the laborer students were literate, hence the impetus to improve their handiwork skills. Foreman and contractor students, in order to be capable supervisors, had to be able to read and write to enroll. Fifty-four percent of the graduates were married, with an average household size of 12.3 per student, making secondary benefits available to more than 2,300 family members. Although tracking students after they graduated was difficult, it was safe to presume that at least 40 percent of graduates received a job immediately after course completion.

Carpentry students erect a wall for a B-hut.

A technical director reviews B-hut designs and work schedules with a student.

In the 11 months that the initial vertical ESDW ran, more than $1.2 million were injected into the local Afghan economy through the purchase of tools, equipment and materials and the salaries for 32 employees. Total expenditures for the fall 2008 horizontal ESDW came to $394,796, including the cost of 13 pieces of rented heavy equipment, salaries for 23 employees, and gravel.

Way Ahead

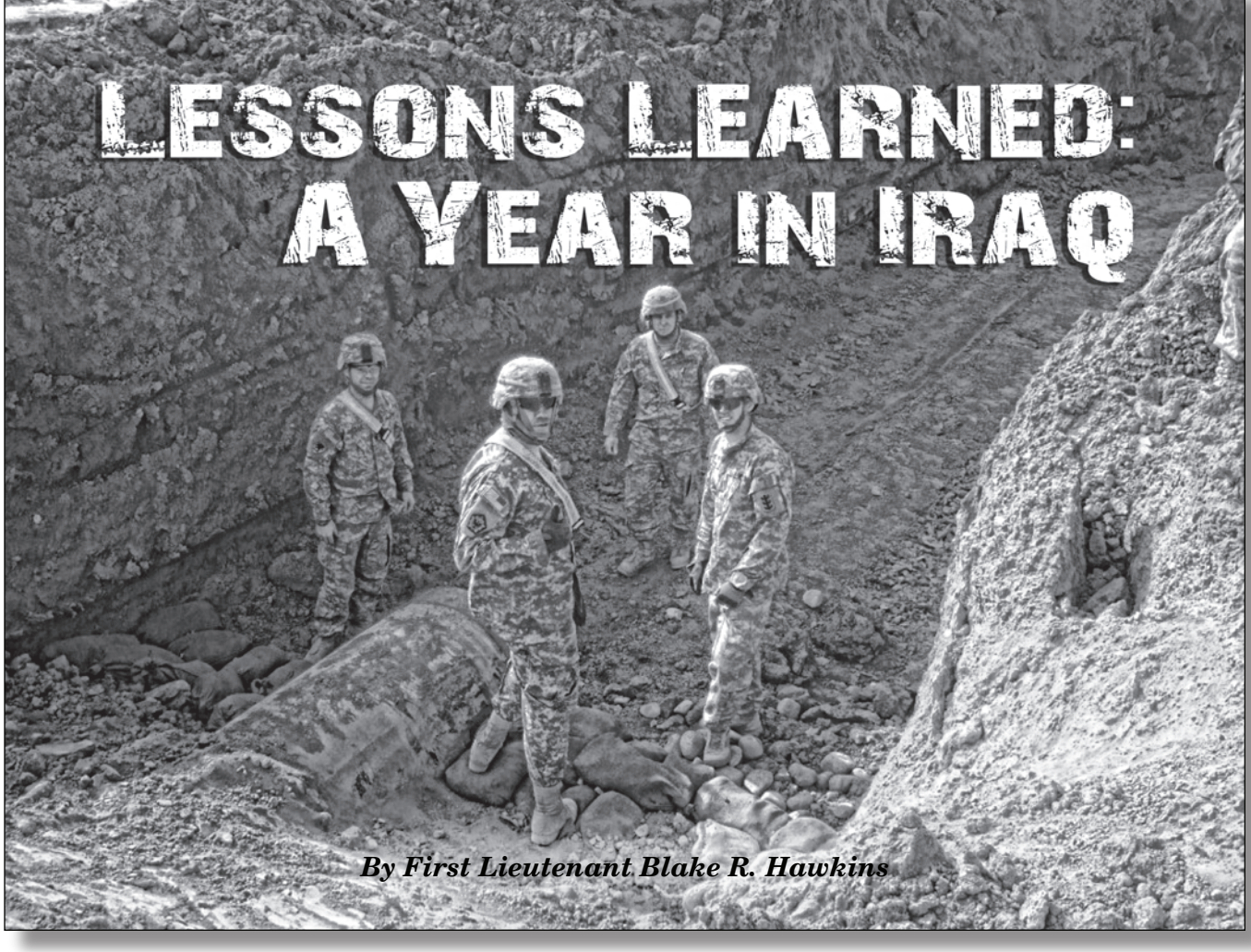
Currently, the focus is on shifting from the short training sessions to the semester program. On 28 June 2009, the contractor class began with 10 days of theoretical work, followed by 21 days of joint training with the vertical foreman class and another 21 days of joint training with the horizontal foreman class. This concept was designed to give contractors enough field time in both vertical and horizontal disciplines to practice their planning and supervisory skills. The vertical foreman class, after its initial 3 weeks of hands-on construction, will then go on to train and supervise the follow-on laborer students—either masonry and plumbing or carpentry and electrical—for another 76 days. In total, contractors will receive 52 days of training, vertical foremen 97 days, vertical laborers 76 days, horizontal foremen 87 days, and heavy equipment operators 66 days. The extended duration meets the requests of the students and follows the USAID model. Student stipends matching unskilled laborer wages serve to alleviate enrollee worry about lost earnings.

The long-term vision is to establish the provincial capital as the education and trades training hub of the region. One of Task Force Hammer's final accomplishments was winning approval from the Ministry of Education to occupy the local Center for Educational Excellence facility for the workshops. Using this location gives both workshops a centralized location to work and consolidate both vertical and horizontal ESDW staff and students. It also provides free lodging for out-of-town students.

Additionally, Combined Task Force Castle, 420th Engineer Brigade, began talks with a couple of American universities to develop a 2-year construction management degree program for contractors. The idea was to send exceptional students, engineers, and current contractors to Kabul for further study in an emerging construction management major program at the American University of Afghanistan (AUoA). When Combined Task Force Castle redeployed in March 2009, this initiative was passed on to the incoming unit, Combined Task Force Storm.

Although currently there is collaboration between the Afghan government and coalition forces, the ultimate goal for the ESDW is to be a self-sustaining entity that continues to shine as a beacon of progress for the people of the province. With the provincial government having very limited funds, the appeal must be directed at the national ministerial levels. Some suggestions have been to request support from the Ministries of Labor, Social Affairs, Martyrs, and Disabled; Rural Rehabilitation and Development; or Transport and Civil Aviation. Another possibility under consideration is to request financial support from the Ministry of Defense in exchange for training Afghan National Army engineers in a program resembling advanced individual training in the United States Army.

Captain Mohapatra is the civil-military operations officer in charge for the 62d Engineer Battalion (Combat) (Heavy), 168th Engineer Brigade. Previously she was an earth-moving platoon leader with the 62d Engineer Battalion, and a support platoon leader with the Special Troops Battalion, 2d Brigade Combat Team, 4th Infantry Division. She is a 2006 honor graduate of the Engineer Officer Basic Course at Fort Leonard Wood, Missouri.



LESSONS LEARNED: A YEAR IN IRAQ

By First Lieutenant Blake R. Hawkins

This summary of lessons learned after a year as a platoon leader of a horizontal construction platoon in Iraq details what one unit learned that might help other units that deploy. It will also serve as a reference for the specific missions our platoon executed and what we learned from them. The lessons learned apply across a broad spectrum of operations, no matter what engineer missions are being performed. The 561st Engineer Company deployed with more than 150 Soldiers—3 line platoons, and 1 maintenance platoon during Operation Iraqi Freedom. The platoons included 2 horizontal platoons and 1 vertical platoon.

One of the most important things we learned—through good and bad experiences—is the importance of a reconnaissance. The unit being serviced will send pictures and descriptions of the work it wants done and may even specify what equipment to bring. But that unit's leaders probably are not engineers, and even if they are, they will not be executing the mission. The battalion will be pushing for an accurate schedule and the earliest possible start date. Remember that the schedule is likely to be much more accurate if you have walked the site yourself. It could save additional trips to bring up equipment that you would not realize you needed if you had not been to the site before.

We also found out the hard way that the platoon needs a little time between long missions—generally anything longer than 10 days. The unit needs maintenance time for any of the equipment that malfunctioned during the previous mission and to prepare and resource the equipment set for the next mission. Also, it will keep morale higher if the Soldiers have time to recover from long days on the worksite and enjoy whatever local amenities are available. It is important to be aware of the effects that long back-to-back missions can have on Soldiers, especially if they are pushed hard to complete those missions by a certain date. Finishing projects early did not lengthen our time between missions because there was always another project waiting. Leaders should give Soldiers days off while on the project, because that is one of the few times they can control their own schedule.

Between missions, it is vitally important to keep the equipment running properly in case it is needed for the next mission. This is also the time to accomplish all the different services, annual and semiannual, before the next mission starts. Make friends with the Soldiers in the maintenance section. If they want to help you, a lot can be accomplished in a short amount of time. For any mission that requires a lot of equipment, it is also important to take mechanics; repair parts; and petroleum, oil, and lubricants. Equipment breaks down, and most forward operating bases (FOBs) do not have mechanics who know how to work on engineer equipment or have parts for it.

No matter what the mission is, don't forget about drainage. It does rain in Iraq, and the water does not infiltrate the ground as it does in most places in the world, sitting instead on top of the ground for days at a time. The finished

"One of the most important things we learned—through good and bad experiences—is the importance of a reconnaissance."

project may look good when it is complete in the dry season, but may end up underwater when it rains. If available, use surveyors to ensure that the water is draining away from the project. If surveyors are not available, do the best you can with a trained eye.

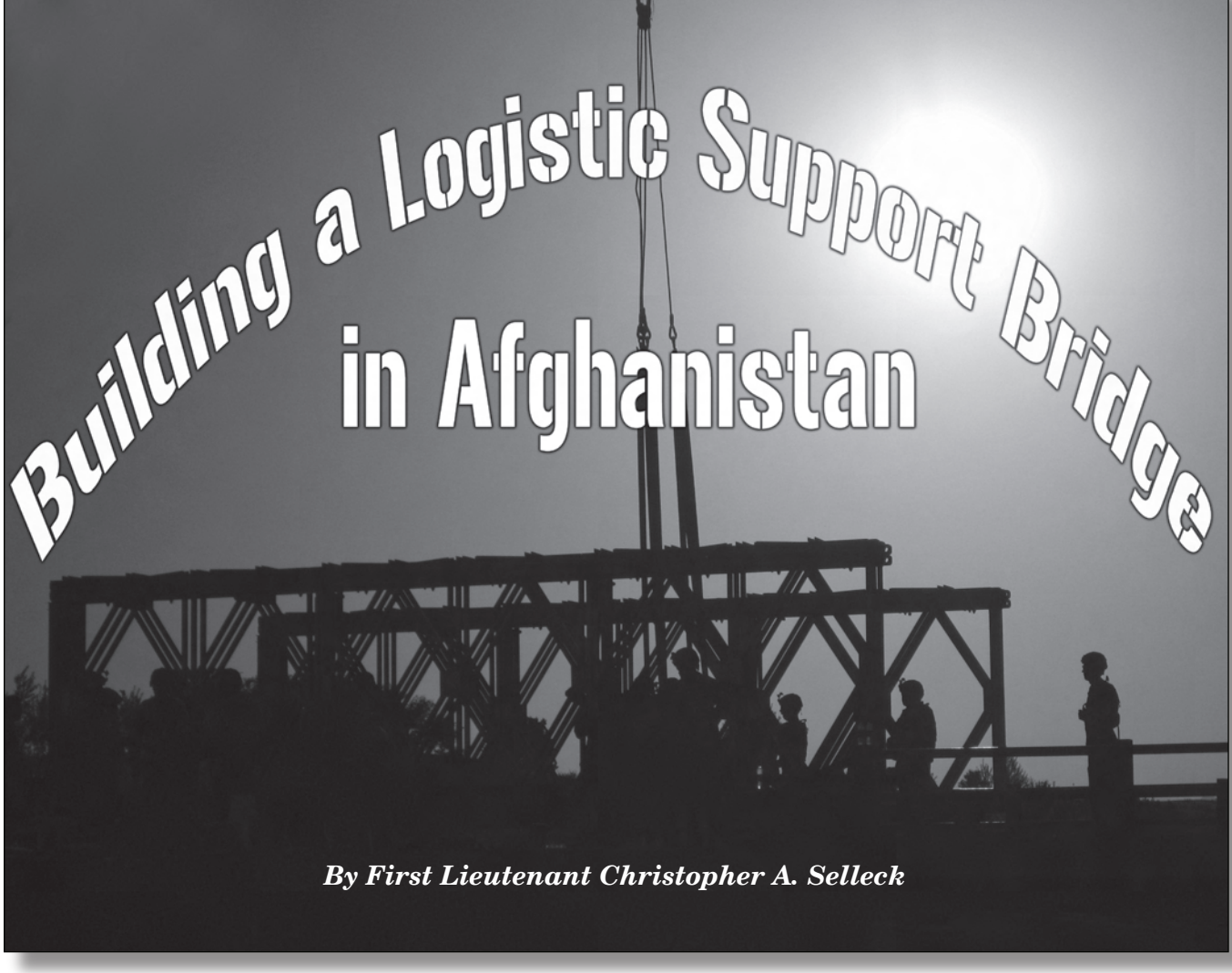
Train younger Soldiers on as many pieces of equipment as possible on each project. This will affect progress, but it is a good opportunity to cross-train operators on different machinery. Most of them will be noncommissioned officers on their next deployment, and this is the time to get them the training and proficiency they need for promotion. Before the mission starts (and before the reconnaissance, if possible), make sure to get a clearly defined scope of work. Customers frequently asked for additional work once a project was started. If the requested job was small, and we were capable of doing it with our equipment, we would oblige them. But remember that your battalion assigned specific work and that there are more missions waiting after completion of the current job.

Following are lessons learned from specific missions:

- In building an earthen road to Class B standards, we learned that the most important factor is the availability and application of water. Without water, there is no compaction and the road will not hold up. If there is not a large, renewable water source nearby, it might be necessary to locate and convoy to one. This might not be practical and will inevitably draw out your timeline. Technically, this is a "make-or-break" issue for the project. During the middle of winter, working 24 hours a day, we used approximately 30,000 gallons of water a day for a month. We estimated that to construct the same road in the middle of the summer, with its heat and evaporation, would take approximately 60,000 gallons a day. Also, for best results, surveyors should be on-site the day the project starts and for as many additional days as possible. Ensure that the surveyors do not emplace center-line grade stakes until near the end of the project. It is difficult for the Soldiers to operate big equipment around the stakes, and in the end, the stakes are knocked out anyway.
- Having a mechanic on-site was important, because he constantly worked to keep the mission on schedule. He fixed the water distributor four or five times and used parts from one scraper to keep another working. During the project, several pieces of equipment broke down. Extra parts and equipment should be on standby, ready to push out to the jobsite. After completing the project, ensure that the customer understands that no matter how well-built the road is, it will need maintenance. Rain and high-speed traffic wear the road surface down quickly.
- Reconnaissance is paramount for rapid crater repair (RCR) missions. Pictures and dimensions reported by the operational environment owner may fail to convey the true scope of the work required. If cement is used for an RCR mission, it should contain accelerant. Otherwise, Soldiers may have to wait at each hole for hours while cement sets.
- Missions that require spending weeks in a desolate location can be improved by taking along some items that will improve the quality of life. We spent approximately 45 days in the blistering heat of an Iraqi summer, living in the middle of an agricultural field while we built a joint combat outpost. One of the biggest morale boosters the unit had was a refrigerator van that let us keep ice on hand. Cold drinks and ice are invaluable in this type of environment and made life much more bearable.
- Try to get some unified ground rations express (UGRE) before starting the mission. UGRE are self-heating, three-course meals that serve 12 Soldiers or more and are much tastier than meals, ready-to-eat. Packages of chips, fruit juice, Gatorade®, and other snack items from the dining facility help to break the monotony of eating the same food day after day.
- Bring along anything that can provide shade, since the sun will drain everyone's energy, and Soldiers will welcome a cooler place out of the sun to rest. Of course, working at night when possible allows Soldiers to work longer and reduces the threat of heat injury.

Firsthand knowledge of the worksite before a mission begins, and equipment maintenance when the mission is complete, were two of the major lessons learned during the 561st Engineer Company's deployment. The value of training and simple morale boosters during the mission was another valuable lesson learned. Taking proper care of Soldiers and their equipment is crucial to a successful deployment.

First Lieutenant Hawkins serves with the 561st Engineer Company, 84th Engineer Battalion, which recently returned to Schofield Barracks, Hawaii, from Operation Iraqi Freedom. He holds a bachelor's in environmental engineering.



Building a Logistic Support Bridge in Afghanistan

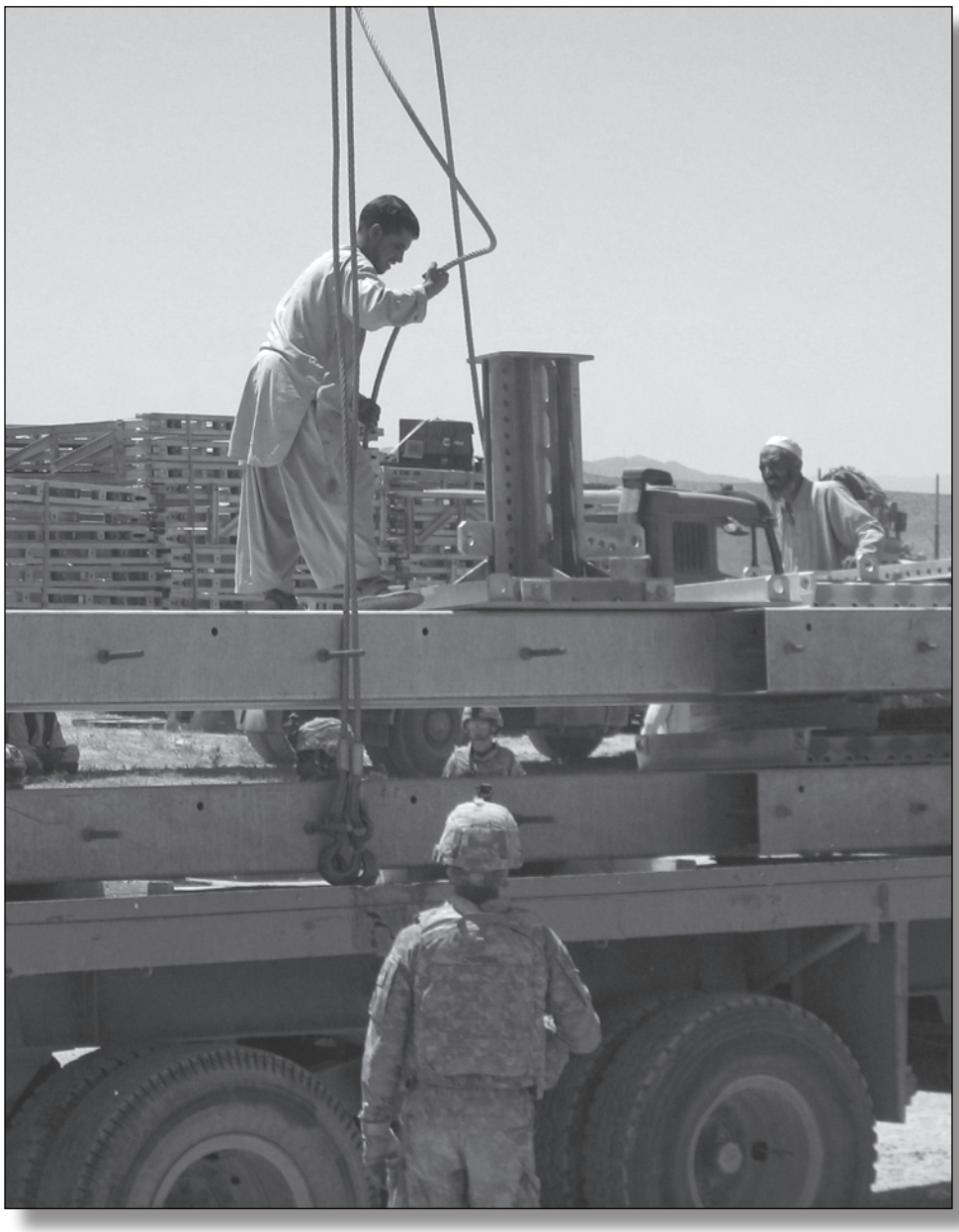
By First Lieutenant Christopher A. Selleck

In mid-February 2009, the Soldiers of the 4th Engineer Battalion (Combat Effects), deployed from Fort Carson, Colorado, to Baghdad, Iraq, to provide route clearance support for Multinational Division–Baghdad. The battalion, operating from Camp Liberty, received orders within weeks of its arrival to move its efforts to southern Afghanistan to support the influx of U.S. forces heading to the region. As the Soldiers packed up their equipment, leaders at all levels shifted their focus from conducting operations in the highly congested urban streets of Baghdad to the wide-open desert and mountain passes of Afghanistan. Despite the challenges and the new tactics associated with conducting rural route clearance, the Soldiers of the 4th remained optimistic.

In Kandahar, while waiting for the arrival of its route clearance equipment, the battalion was asked to help construct a 150-foot Mabey-Johnson logistic support bridge (LSB) on an overpass that had been damaged by an improvised explosive device (IED). The bridge was located on Highway 1—known as Ring Road—2,100 kilometers of almost completely paved road that encircles Afghanistan and links the roads that lead to its international borders. Because of this, mobility along this road is critical for locals as well as coalition forces. The battalion commander decided to dedicate the Soldiers of the 576th Engineer Company (Mobility Augmentation) to the task.

The advantage of the Mabey-Johnson LSB over the more widely known Bailey bridge is its strong steel deck and transom system. The Mabey-Johnson LSB requires far less material to provide a much higher military load class (MLC). Also, because the overpass was still intact, a crane could be used to construct the entire bridge, as opposed to building a temporary launching nose and rollers and using the cantilever system, a common construction technique for both the Bailey bridge and the Mabey-Johnson LSB.

The 576th Engineer Company primarily consists of combat engineers who have little experience with military bridging beyond the small block of instruction taught in advanced individual training. Thus, the company relied on the expertise of a British Army captain and a Canadian Army warrant officer to guide the construction effort. The company was split into two elements: security and construction. The security platoon escorted vehicles and equipment 161 kilometers to the site, then provided a security cordon for the construction platoon. It also coordinated outer security cordons set by other coalition forces to control traffic. The construction platoon began work at Kandahar Airfield on 5 May, nine days before leaving for the site. The Soldiers were assisted by two coalition crane operators using a German Army crane to reinforce the frame sections of the bridge in order to support the designed MLC and to load the trucks efficiently to reduce construction time.



Afghan workers unload a truck under the eyes of American Soldiers.

The security platoon departed Kandahar Airfield for the bridge on the morning of 14 May. Movement was halted by a mechanical malfunction of the crane, which ended up delaying construction for two days. When the crane arrived at the site on a flatbed trailer, the inner cordon was established and the area was cleared using mine roller equipment and a specialized search dog from the 94th Engineer Detachment, Fort Leonard Wood, Missouri. To maintain an aggressive posture on the site while waiting for the crane to be fixed, the company conducted dismounted patrols of the area. Almost daily enemy IED activity to the west heightened the Soldiers' state of alertness.

On 17 May, a new crane arrived, and the original crane was repaired. This allowed construction to move at a pace quicker than anticipated. The heaviest and most critical piece of the bridge—the near-shore ground beam—was placed first. At nearly 5 tons, it had to be precisely placed and centered or the entire bridge would veer off in the wrong direction. Once it was placed, the tedious process of emplacing 15 bays consisting of panels, transoms, bracing, and decks began. When the new bridging reached the middle of the damaged overpass, construction from both sides was possible. While bays were being added from the far shore, the crane on the near shore helped place decking and the near-shore ramp.

The Soldiers of the 576th worked in shifts around the clock with only a short rest period in order to reduce time on-site. Minor problems called for creative solutions, but no problems arose that halted construction for any length of time. For example, upon completion of the ninth frame, the construction platoon discovered that the bridge was 7 inches off center. Instead of removing frames to correct the problem, the platoon (with help from the crane and several Soldiers from the security platoon) used manpower to slowly move the bridge back on center. The platoon also employed building techniques using vehicle jacks, ratchet straps, and tanker bars to help get the bridge pieces assembled.

The Soldiers completed the bridge on 19 May, with a total construction time of approximately 50 hours. The security and construction platoons, along with the route clearance patrol, moved from the bridge site back to their forward operating base as night was approaching. The next morning, the company began to make its way back to Kandahar. With minimal training, the Soldiers of the 576th Engineer Company dramatically improved mobility and freedom of maneuver along Highway 1, aiding the people of Afghanistan and coalition forces.

First Lieutenant Selleck is the operations officer for the 576th Engineer Company (Mobility Augmentation), 4th Engineer Battalion. Previously, he was a platoon leader with the 576th Engineer Company. He is a graduate of the United States Military Academy at West Point, New York.

Building Civil Capacity in Iraq

By Colonel Scott F. "Rock" Donahue and Major Daniel L. Higgins

"Modern man's capacity for destruction is quixotic evidence of humanity's capacity for reconstruction. The powerful technological agents we have unleashed against the environment include many of the agents we require for its reconstruction."

–George F. Will

On 14 February 2008, the United States Army's XVIII Airborne Corps assumed command of Multinational Corps–Iraq (MNC–I) from III Corps. Operation Iraqi Freedom was at a critical turning point, nearing the end of the "surge" of more than 25,000 troops. From April to August 2008, the five surge brigade combat teams (BCTs) departed the Iraqi theater of operations. With improved security and a refined approach to counterinsurgency operations, the new operational environment was characterized by vast economic growth opportunities and an explosive demand for essential services. Against this backdrop, MNC–I focused on deliberate planning and execution of its third line of operation (LOO)—building civil capacity.

The holistic approach to developing civil capacity involved coordinating and synchronizing the capacity-building efforts of multiple stakeholders, including coalition forces, provincial reconstruction teams (PRTs); international organizations; and most important, local, provincial, and national Iraqi government agencies. This article documents MNC–I's processes, best practices, and lessons learned in coordinating the joint, interagency, intergovernmental, and multinational initiatives necessary to successfully transition civil capacity development to a capable Iraqi government with support from PRTs and international organizations.

Evolution of Nonlethal Effects

"An organization's ability to learn, and translate that learning into action rapidly, is the ultimate competitive advantage."

–Jack Welch

From 2007 to 2008, improved security significantly increased public expectations for government-provided services. In May 2008, XVIII Airborne Corps envisioned a conceptual framework for civil capacity development and transition in Iraq as depicted in Figure 1. XVIII Airborne Corps and its subordinate units played a key role in providing minimum essential services such as sewer, water, electricity, trash disposal, refined fuel products, and health care to the Iraqi population while the Iraqi government steadily developed its own capability, enabled by U.S. government agencies, international organizations, and nongovernmental organizations (NGOs).

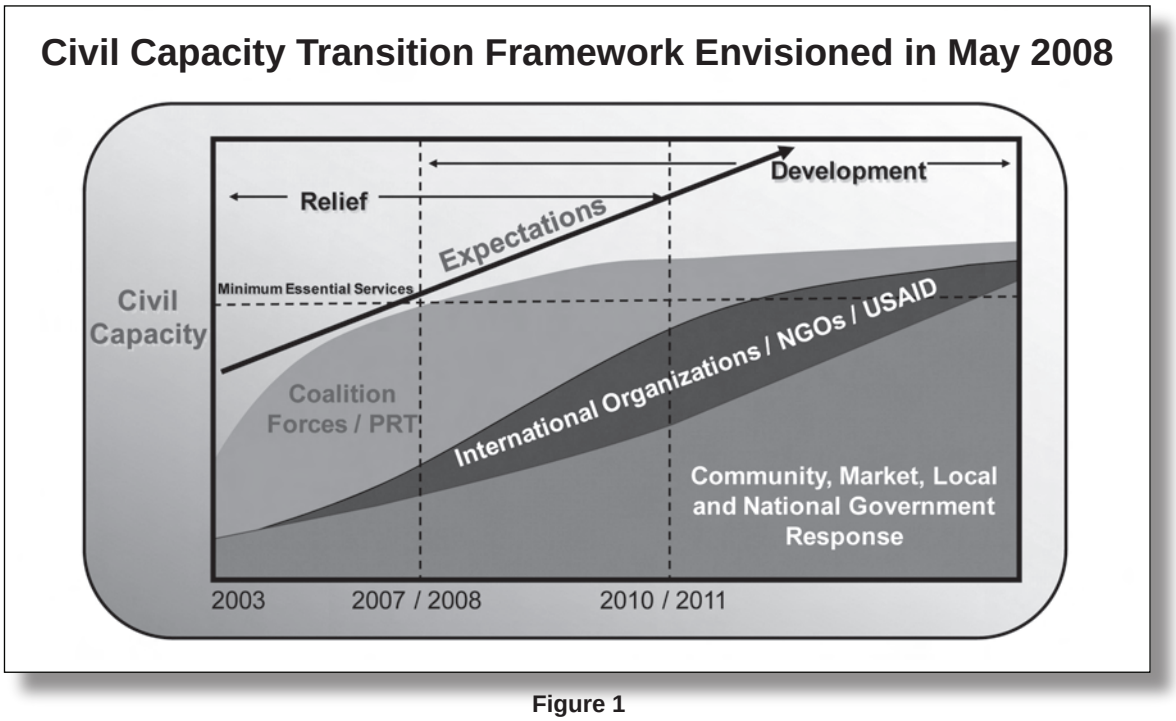


Figure 1

MNC–I was made acutely aware of this shift on 26 June 2008, when a Multinational Force–West (MNF–W) weekly situation report articulated the need for a comprehensive, fully integrated approach to achieve lethal and nonlethal effects in Anbar Province. The approach would require tactical- to strategic-level key leader engagement with the Iraqi government. Coordination and planning for nonlethal effects at this stage of the campaign were primarily synchronized by the soft-power joint planning team (JPT) led by MNC–I's engineer staff section (C7) and consisting of elements from the following organizations:

- Future operations (FUOPS [C35])
- C7 Infrastructure Protection and Reconstruction section
- Staff Judge Advocate (SJA)
- Civil affairs (C9), Economics and Governance section
- MNC–I surgeon
- Others

The June MNF–W situation report reinforced the need for an MNC–I civil capacity champion—a corps-level lead—to provide a broader, deeper approach to integrating civil capacity with lethal operations aimed at achieving sustainable security and developing Iraqi Security Force (ISF) capability.

On 1 July 2008, the soft-power JPT convened to address the issues raised by MNF–W. Concurrently, MNC–I senior leaders and staff principals collaborated to formalize a more robust and enduring approach to synchronizing civil capacity initiatives. Complexity frustrated this process as the civil capacity LOO consisted of four prioritized objectives involving three primary staff sections:

- Transparent and accountable governance (C9)
- Sustainable economic development (C9)
- Provision of essential services (C7)
- Firmly established rule of law (SJA)

The operational objective of the civil capacity LOO focused on effectively executing tasks required by these four discreet objectives to reinforce security gains and legitimize the Iraqi government.

July 2008 involved several planning iterations to integrate and synchronize civil capacity within the XVIII Airborne Corps planning cycle, since the best approach had yet to be determined. This process ran parallel with the soft-power JPT mission analysis and course of action (COA) development for Anbar civil capacity integration (CCI). To adequately plan for robust Anbar CCI, the soft-power JPT expanded to a larger, more permanent group called the Civil Capacity Integration Team (CCIT), led by the director of MNC–I C7. The group received planning guidance and direct oversight from the MNC–I deputy commanding general (DCG) and the DCG for Coalition and Infrastructure. Tasks for the CCIT were—

- Exploit security gains through the civil capacity LOO.
- Synchronize nonlethal enablers to complement lethal operations.
- Conduct nonlethal targeting by incorporating nonlethal enablers in support of operational priorities.

Sensing a need for a more permanent staff section principally dedicated to the nonlethal portion of the campaign, the MNC–I chief of staff and the operations (C3) section formed a nondoctrinal staff section called C3 Nonkinetic (nonlethal) FUOPS, or C35 NK. This emerging organization was manned by permanently assigned officers from MNC–I coordinating and special staff sections and major subordinate commands already involved in civil capacity development. These were primarily the C9, C7, SJA, and 304th Civil Affairs Brigade. The C35 NK mission was to coordinate and synchronize MNC–I's nonlethal enablers according to the priorities of the MNC–I commander to—

- Exploit security gains.
- Deny resurgence of violent extremists.
- Build civil capacity.
- Advance sustainable security in Iraq.

C35 NK was formally established on 28 July 2008 and was staffed as shown in Figure 2, page 54. With a clear mission and an increasingly important LOO to synchronize and integrate, C35 NK set out to facilitate civil capacity planning in support of MNC–I's named operations.

Making the Civil Capacity Mission Operational

"I must study politics and war that my sons may have the liberty to study mathematics and philosophy."

–John Adams

Designed to plan nonlethal operations in parallel with the XVIII Airborne Corps FUOPS section, C35 NK spent its first few months establishing a niche within the existing corps staff framework and operational battle rhythm. Immediate effort went into developing civil-military operations plans for execution during post-lethal operations in the northern Tigris and Diyala River Valleys in support of Operation Glad Tidings of Benevolence (GTOB). August through October 2008 was a challenging period as C35 NK endured the uncertainty of organizational change. Planning efforts for the northern Tigris and Diyala River Valleys failed to gain widespread acceptance at the division level, where subordinate commanders and staff were skeptical of infusing higher-level follow-on nonlethal direct support into previously planned division operations. Nevertheless, MNC–I and its subordinate commands steadily made nonlethal gains, although C35 NK's role was somewhat limited. Eventually, C35 NK's functions transformed from purely planning to synchronizing efforts in support of the civil capacity LOO.

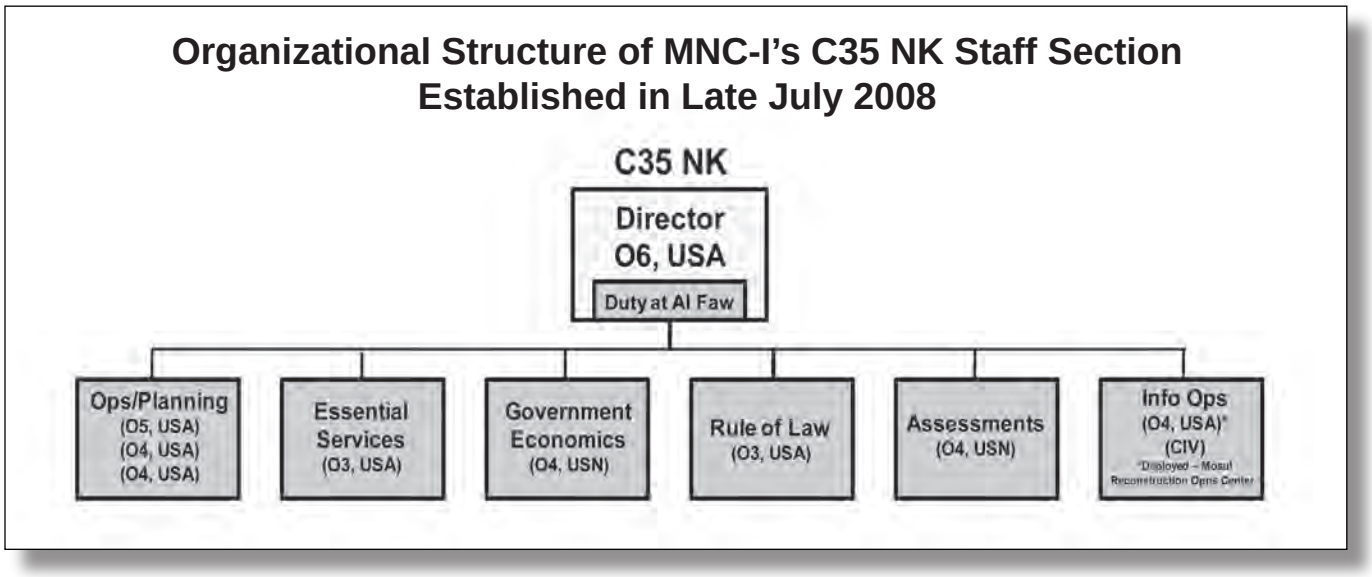


Figure 2

In its refined role, C35 NK provided responsive staff support to MNC–I senior leadership, coordination and synchronization to MNC–I primary staff sections responsible for lethal operations, and coordinating support to interagency partners. Integration of nonlethal effects during and after lethal operations was fundamental to the success of MNC–I's counterinsurgency operations. This was particularly true as the ISF increasingly took the lead in lethal operations, although they hadn't thoroughly developed nonlethal aspects to complement these operations. Civil capacity projects, through the Commanders Emergency Response Program (CERP) and the Iraqi Commanders Emergency Response Program (I-CERP), achieved success in Diyala Province during Operation GTOB. These programs improved the delivery of essential services and changed the perspective of Iraqi citizens about the top problems in their neighborhoods.

Operation GTOB was the first major combined operation collaboratively developed by MNC–I and Iraqi Ground Force Command planners. The operation revealed the increased demand for essential services once security was established. It also provided a number of nonlethal lessons learned for inclusion in future operations to achieve sustainable security.

Refining for Success: Synchronizing Civil Capacity Stakeholders and Partners

"Plans are only good intentions unless they immediately degenerate into hard work."

– Peter Drucker

As the Iraq campaign continued to unfold during the summer and fall of 2008, MNC–I started planning a new operations order (OPORD) to accommodate the rapidly changing operating environment. The civil capacity working group assembled in late August and began mission analysis. Several key factors influenced the planning process for the civil capacity LOO. The most compelling change was the expiration of United Nations Security Council Resolution 1754 on 31 December 2008. The new MNC–I OPORD would require coalition forces to work by, with, and through ISF and a sovereign Iraqi government under an emerging yet undefined security arrangement.

Securing the Iraqi population and training and equipping the ISF remained MNC–I's priority, but building civil capacity was steadily increasing in importance. Demand for services continued as security gains allowed displaced persons to return to their homes. Consequently, demand for essential services such as electricity and potable water was outpacing the growing supply. Ultimately, the director of MNC–I C7 assumed ownership of the civil capacity LOO for the development of MNC–I OPORD 09-01. He directed his deputy director for operations, plans, and logistics to lead the civil capacity JPT. The team quickly discovered that there was no standard definition of "civil capacity." An exhaustive search of Army field manuals (FMs), joint publications, and numerous references confirmed this assessment. Consolidating inputs from all of these sources, the team eventually developed a definition that the MNC–I commander ultimately approved:

Transparent and accountable Iraqi provincial and local governments providing essential services to their citizens, and characterized by a firmly established rule of law and sustainable, growing economy.

That definition was derived from the—

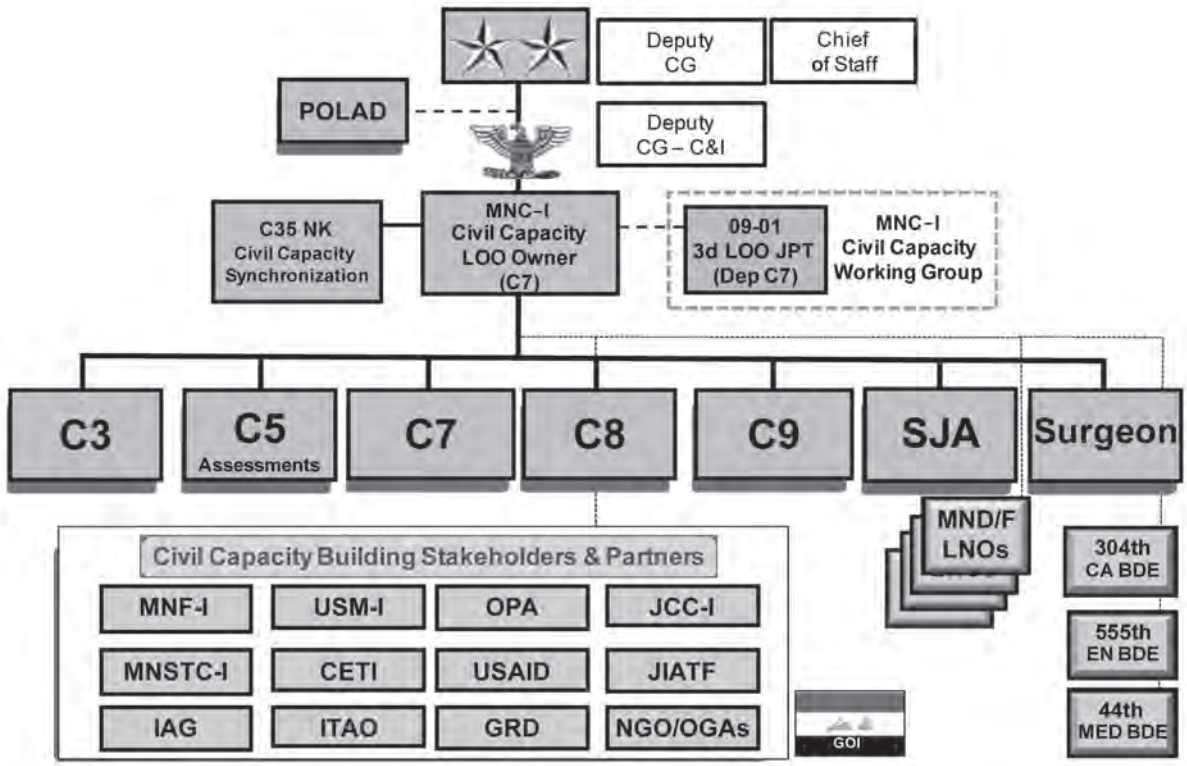
- Joint campaign plan.
- Strategic framework.
- Draft unified common plan.
- FM 3-24, *Counterinsurgency*.
- FM 3-07, *Stability Operations*.

The experienced team rapidly assimilated lessons learned during previous planning efforts which helped shape the mission analysis and COA development for MNC–I OPORD 09-01. Throughout September and October 2008, the JPT met three times per week to develop the MNC–I civil capacity strategy. The planning effort also included key partners from the Office of Provincial Affairs (OPA) and the United States Agency for International Development (USAID). These team members provided invaluable insight from the Department of State (DOS) perspective, assuring DOS and PRT objectives were fully integrated.

The MNC–I commander approved the recommended COA for the civil capacity LOO on 8 November 2008. The LOO consisted of four objectives linked to, and nested with, OPA's five lines of action and Multinational Force–Iraq's (MNF–I's) five LOOs in the joint campaign plan. These objectives were similar to MNC–I's OPORD 08-02 objectives but were refined to reflect two key factors:

- The DOS would be the supported agency for civil capacity development in Iraq.
- Coalition force capacity-building efforts would focus on cementing the security gains made to date.

MNC–I Civil Capacity Synchronization Board



Legend:

Bde	brigade
C5	plans
C8	resource management
C9	civil affairs
C&I	coalition and infrastructure
CA	civil affairs
CETI	Coordinator for Economic Transition in Iraq
CG	commanding general
Dep	deputy
EN	engineer
GOI	government of Iraq
GRD	Gulf Region Division, United States Army Corps of Engineers
IAG	Iraq Assistance Group
ITAO	Iraq Transition Assistance Office
JIATF	joint interagency task force
JCC–I	Joint Contracting Command–Iraq
LNO	liaison officer
MED	medical
MND/F	Multinational Division/Force
OGA	other government agencies
OPA	Office of Provincial Affairs
POLAD	political advisor
USM–I	United States Mission–Iraq

Figure 3

Concurrent with MNC–I OPORD 09-01 planning, the MNC–I civil capacity LOO senior leadership introduced a new idea for a synchronization forum, which became known as the Civil Capacity Synchronization Board (CCSB), chaired by the MNC–I DCG and facilitated by the MNC–I DCG for Coalition and Infrastructure. The intent was to augment the existing corps planning framework and support the C7 civil capacity LOO owner by providing general officer guidance and a single forum for all stakeholders to present initiatives in support of the multinational divisions (MNDs). The MNC–I commanding general approved the concept and the CCSB convened for the first time on 4 November 2008. The forum immediately proved invaluable in providing guidance for executing MNC–I's civil capacity LOO, as well as ensuring the coordination and synchronization of DOS partners. The CCSB ultimately evolved into the premier venue for MNC–I civil capacity integration with major subordinate commands, the United States embassy, MNF-I, OPA, and international organizations such as the United Nations Assistance Mission–Iraq. Figure 3 depicts the organizational structure of the CCSB and lists the participating stakeholders.

"MNC–I focused on deliberate planning and execution of its third line of operation—building civil capacity."

The final coordination mechanism to codify civil capacity development initiatives was formalizing the relationship at the operational level between OPA and MNC–I. At the strategic level, MNF–I was guided by the joint campaign plan and strategic framework agreement with the U.S. embassy. The strategic framework agreement also established a coordinator for economic transition in Iraq and directed the development of unified common plans at the MNC–I and MND levels. At the tactical level, MNDs and BCTs developed joint campaign plans with their paired PRTs, but no formal operational-level arrangement existed between MNC–I and OPA.

In late November 2008, a new JPT formed with OPA to draft a unified common plan amenable to both organizations and to formalize the support MNC–I would provide OPA as lead U.S. government agency for civil capacity development in Iraq. It also defined the mechanisms to coordinate planning and to eliminate conflicts in the employment of U.S. resources. Ultimately, the objective was to provide unity of effort across DOS and DOD entities at the operational level. Furthermore, the unified common plan sought to provide a civil capacity common operating picture, shared expectations, synchronized guidance, and prioritized U.S. resources. It also refined the process for subordinate unit plans—MNDs/PRTs and battlefield owners/embedded PRTs—by defining a new provincial unified common plan framework and coordinating guidance. The plans generated by the PRTs as part of this process were coordinated and synchronized across the theater of operations by DOS and DOD elements alike.

Civil Capacity Handover to I Corps

"Our job is not to build it for them; our job is to help them build the capacity so that they can use their own substantial resources to do things for themselves."

–Ambassador Joseph Saloom

In the final analysis, MNC–I's civil capacity-building efforts were remarkably successful. Its successful management of the postsurge security environment enabled the subsequent transition to Iraqi-led security operations as the ISF continued to grow in experience and capability. As of April 2009, attacks and casualties were down to 2003 pre-insurgency levels. The ability of Al Qaeda in Iraq to conduct sustained operations was severely degraded. The improved security also enabled MNC–I to focus on stability operations and capacity-building throughout most of the theater of operations. The provincial elections held on 31 January 2009 occurred under Iraqi control without incident, and the process to seat the new provincial governments proceeded as planned.

A closer evaluation of MNC–I's civil capacity objectives confirms this assessment. With respect to improved governance, the successful provincial elections indicated the significant strides made by the Iraqis. Notwithstanding friction points such as Arab-Kurd tensions in the north and the proposed Iraq hydrocarbon law, results to date are noteworthy. Significant improvements in providing essential services during the corps's tenure, particularly in the critically important electrical sector, were also made. As of April 2009, electrical generation was at the highest point in Iraq's history, greater than 125,000 megawatt hours, and there are plans to add an additional 20 percent to the grid by the end of 2010.

Other essential services improved as well, and with PRT and coalition support will transition to capable Iraqi agencies. The rule of law continues to improve throughout Iraq, particularly in judicial security, detention operations, and the investigative capacity to support criminal prosecutions. Additional effort is required to reduce cultural tolerance for corruption, reform business laws, and increase transparency, but Iraqi leadership has expressed a willingness to do all three. Economic activity continues to expand in a number of sectors other than petroleum, which is critical for a broader Iraqi economy. The hospitality and service industries show positive signs in areas supporting religious tourism, and foreign direct investment to improve oil, gas, and electrical sectors appears imminent with a relatively low global price for oil. In summary, from the tactical to strategic levels, MNC–I's full spectrum civil capacity influence set positive conditions for handover to I Corps in April 2009, and for continued civil capacity development as U.S. forces withdraw by the end of 2011.

The primary tools used to facilitate civil capacity initiatives at the tactical level were the CERP and the Iraqi-funded version, I-CERP. These programs facilitated the civil capacity building projects that led to the success previously

(continued on page 59)

Soldiers Run to Remember Fallen Hero

By Sergeant Rebekah Malone

At daybreak on a warm desert morning in Baghdad, nearly 1,000 Soldiers joined together to remember one of their own in a moving tribute. On 5 April 2009, six years after Sergeant First Class Paul Ray Smith of Tampa, Florida, lost his life defending more than 100 troops, Soldiers of the 46th Engineer Battalion (Combat) (Heavy), 225th Engineer Brigade, held a run in honor of his memory.

The run's distance—11.46 kilometers—stood as a tribute to Smith's unit and comrades. The actual battle site served as the starting and ending point for the racers. Casually listening, one could not help overhearing Soldiers use a powerful word to describe their comrade: hero.

A first sergeant who met Smith in 2000 when they served as platoon sergeants of Alpha and Bravo Companies, 11th Engineer Battalion, said that he was impressed by the personal interest Smith took in each of his Soldiers, as evidenced by how all of them had only great things to say about him when he was a platoon sergeant. Specifically, they respected the way he took care to sit down with them and talk to them on a personal basis as well as a professional one.

Photo by Sergeant Rebekah Malone

The watchtower, riddled with bullet holes, is a haunting reminder of the battle that took the platoon sergeant's life.

His fellow platoon sergeant and friend explained that Sergeant First Class Smith lived the Army Values daily and could be described as "an awesome fellow noncommissioned officer" who went out of his way to take care of his Soldiers

Photo by Staff Sergeant Bradley West

Photo by Sergeant Rebekah Malone

A participant of the Sergeant First Class Paul Ray Smith Memorial Run wears a shirt that displays the photo of the fallen hero.

on and off duty. His friend arrived at the 4 April 2003 battle after Smith had been mortally wounded, to assist in securing the area. Smith had manned a .50-caliber machine gun atop a damaged armored personnel carrier after the gunner was wounded, effectively killing 25–50 enemy combatants of the estimated 100 attacking the courtyard by the highway between Baghdad International Airport and Baghdad itself.

Sergeant First Class Smith's actions deescalated the attack and saved reportedly up to 100 Soldiers. What remains are the bullet holes in the watchtower and the memory of a Soldier who stood for other Soldiers, including the more than 4,200 servicemembers who have died during Operation Iraqi Freedom. Smith's fellow platoon sergeant and friend was amazed after five years at how much this area had changed with the buildup of troops; he wanted to find the area where the engagement took place and see if anyone had done a memorial. He discovered that there was nothing there. Until now . . . .

On the sixth anniversary of his death and in honor of the fallen hero, Soldiers placed a memorial marker on the concrete wall—riddled with bullet holes—which he had defended during the fight. It is a fitting tribute for Sergeant First Class Paul Ray Smith for what he did in this place for his country and its warriors.

Sergeant Malone, a member of the Louisiana National Guard's 225th Engineer Brigade, is a unit public affairs representative in Iraq. A graduate of Pratt Community College, she will soon complete a Bachelor of Arts in Liberal Studies from Louisiana State University in Alexandria.

Note: On 4 April 2005, Sergeant First Class Paul Ray Smith was posthumously awarded the first Medal of Honor for actions in support of Operation Iraqi Freedom. He was the 14th engineer to receive the military's highest award.

("Civil Capacity," continued from page 56)

described. Iraqi answers to polling questions about their top local concerns revealed a sense of normalcy that improved greatly from February 2008 to February 2009. Employment, rather than security, was the most important issue by a wide margin. Improving a diversified economy and providing jobs will be critical tasks as Iraq moves forward in 2009 and beyond.

To successfully move forward, MNC–I will continue to build on civil capacity best practices and the following key lessons learned:

- Ensure that nonlethal planning is fully integrated with lethal operations.
- Keep civil capacity projects small while security is tenuous and gradually transition to larger programs as conditions permit.
- Ensure that interagency planning and coordination are conducted from strategic to tactical levels.
- Coordinate with interagency partners to develop and maintain a civil capacity common operating picture.
- Expect explosive demand for essential services as soon as security is achieved.
- Prevent loss of momentum by ensuring a thorough civil capacity handover during and throughout transitions.

The final chapters in Operation Iraqi Freedom will be written over the next 24 months. Achieving sustainable security and transitioning the civil capacity mission to fully capable Iraqi government agencies will depend heavily on efforts to train Iraqi officials and continue building on the foundations laid in part by MNC–I during Operation Iraqi Freedom 07-09. Improving security is the catalyst for continued gains, and with the assistance of the U.S. embassy, coalition forces, international organizations, foreign corporations, and Iraqis helping Iraqis, Iraq will remain free and flourish as the liberated democratic nation we set out to create.

Colonel Donahue served as the XVIII Airborne Corps engineer and Director, MNC–I C7 from February 2008 through April 2009. He was responsible for coordinating, synchronizing, and executing full spectrum engineer support for coalition forces throughout the Iraqi Theater of Operations. He holds a bachelor's in civil engineering from the Virginia Military Institute, a master's in operations research from the Naval Postgraduate School, and a master's in strategic studies from the United States Army War College. He is also a registered professional engineer in Virginia.

Major Higgins, United States Army Reserve, is Deputy Commander, 733d Facility Engineer Detachment, based in Fort Leavenworth, Kansas, and served on the MNC–I C7 Infrastructure Protection and Reconstruction staff from September 2008 through July 2009 during Operation Iraqi Freedom. He was the lead corps planner for the "Provision of Essential Services" objective implemented on 1 January 2009 and a contributor to the unified common plan between MNC–I and OPA. He holds a bachelor's in civil engineering from the United States Military Academy and a master's from the Helzberg School of Management at Rockhurst University.

Photo by Captain James Reid

JOINT ENGINEER– A MULTINATIONAL PERSPECTIVE

By Major Jared L. Ware

The Multinational Security Transition Command–Iraq (MNSTC–I), a subordinate command of Multinational Force–Iraq (MNF–I), is responsible for the construction of facilities for Iraqi Security Forces (ISF) within the Ministry of Defense (MOD), Ministry of Interior (MOI), and Counter Terrorism Bureau (CTB). This includes facilities for the generation of forces, as well as permanent basing for operational units. Within MNSTC–I, the Joint Engineering Directorate (J7) is the primary directorate for planning, executing, and transferring engineer facilities missions in support of the ISF. The J7 coordinates vertically and horizontally with the various coalition staffs, the United States Air Force Center of Excellence for the Environment, the United States Army Corps of Engineers–Gulf Region Division (USACE–GRD), and its Iraqi counterparts within MOD, MOI, and CTB, to ensure a cradle-to-grave engineering process. The purpose of this article is to outline how the MNSTC–I J7 is currently structured to meet requirements, and how the organization is transforming to meet new requirements for 2009.

Structure

The J7 is a joint staff consisting of officers and noncommissioned officers (NCOs) from each of the Services, as well as Department of Defense civilians and contractors. The sole function of the staff is civil engineering, and it does not focus on full spectrum engineering functions such as combat or geospatial. The J7 is organized into the following basic sections:

- MOD construction
- MOI construction
- Construction development cell (CDC)

The MOD and MOI sections derive requirements from the various stakeholders and assign program and project managers to each construction effort. For example, if the Coalition Army Advisor Transition Team (CAATT) defines a requirement for an Iraqi division training facility in central Iraq, then the J7 MOD section leader will assign a program manager and project engineer to the mission.

The program manager helps CAATT define the scope of work and a rough order-of-magnitude cost estimate. The program manager also works with the CDC to prepare a more detailed estimate for the overall cost of the facilities requirement. The program manager and CDC also work with the contracting agency, usually Joint Contracting Command–Iraq or USACE–GRD, to award the case. Also, the J7 hosts the technical evaluation board to ensure that the bidding contractors meet the minimum criteria for the overall design and building of the project. Once the project is awarded, the J7 program manager interacts with all stakeholders to ensure that the project is meeting the statement of work criteria, the projected timeline, and the projected budget. Normally, the source of funding is ISF funding (ISFF), but there are ongoing projects funded through the Security Assistance Office's Foreign Military Sales (FMS) program for construction. Once the project is completed,

the J7 works with the MOD's director general for infrastructure or the MOI's director general for construction to transfer the completed property to the Iraqi government. The process is a total cradle-to-grave process that covers the joint, interagency, intergovernmental and multinational (JIIM) gamut.

Transformation

In 2008, the J7 executed more than 300 ISFF projects from within the MOD and MOI sections at an estimated cost of more than $1 billion. These projects ranged from United States Army shoot houses, United States Air Force dormitories, United States Navy seawalls, Iraqi police stations, and local facilities upgrades. However, the directorate recognized that the MNSTC–I mission, as well as the source of construction funding, was changing. This required the directorate to conduct an in-depth study of the new mission sets and transform its existing joint manning document. The result was an organization that kept the basic construction engineering capabilities but also focused on joint planning and base management. There are various operational planning teams within the MNSTC–I staff that support operational order development, joint campaign planning, and joint basing. The J7 recognized the importance of these teams and of "plugging in" early to the efforts, since most had specific engineering requirements above and beyond the expertise of staff planners in the other directorates. The J7 has now developed a small planning section assigned to conduct all planning functions, to include preaward construction planning. The section also manages the FMS construction mission, currently consisting of several projects valued at approximately $800 million, plus potential projects valued at approximately $400 million.

Another change in the structure is the combination of the MOD and MOI sections into one execution section. As the source of funding transitions from coalition-funded ISFF to Iraqi-funded FMS, there are fewer program management and project management requirements on the horizon. Moreover, there is a growing requirement to improve the engineering competencies at the ministerial levels as the government of Iraq takes on its own engineering programs and projects. The execution section will continue to provide oversight of engineering projects, but take on an additional role as the "right-seat ride" lead as the section interacts with its Iraqi counterparts. Finally, the J7 is developing a base management section that focuses on project transfer and follow-on facilities engineering. In the past, ISF-funded projects were transferred to the government of Iraq, but little future sustainment funding was programmed within the MOD or MOI to provide maintenance and upkeep to the new facilities. The goal of the base management section is to develop processes to facilitate the transfer of facilities, as well as prepare Iraqi facility engineers to properly plan, program, budget, and execute the base management and facilities engineering missions for their respective facilities.

Recommendations

These recommendations are based solely on personal observations, and are focused primarily on the United States Army's Engineer Regiment.

Education and Experience. Given the civil engineering nature of the J7 Engineering Directorate, it is advisable that all incoming personnel possess an engineering or hard science degree, preferably a master's in an applicable discipline. Most of the stakeholders are degreed engineers, and it is difficult to hit the ground running in the assignment without an engineering background, to include an understanding of the facilities engineering and contracting processes. It is also advisable to have engineers attend the Joint Engineer Operations Course before an assignment to MNSTC–I.

Capturing Credentials. A method should be established to capture and document engineering and technical credentials for officers and NCOs. Completing Defense Acquisition Workforce Improvement Act facilities engineering courses, program management professional certification, or managing a multimillion dollar construction project are not formally documented within the human resources system, unless they are stated on a Soldier's efficiency report. The proposed change could help track the development of technical skills required for progressive assignments within the Engineer Regiment.

Directorate Leadership. The past two directors and the incoming director are all from the Navy Civil Engineer Corps community. Over time, the procedures and processes seem to have changed from a truly joint engineering doctrine to one with a Naval Facilities Engineering Command flavor. This has future implications, since most of the MOD facilities are for the Iraqi army. In the future, the directorship should perhaps be rotated among the various services, preferably with senior officers who have previous joint engineering experience.

Conclusion

The purpose of this article was to provide an understanding of the MNSTC–I J7 Engineering Directorate, and explain how the structure is adapting to the changing operational environment within Iraq. As the mission changes from one primarily focused on construction engineering for MOD and MOI to one focused on preparing the Iraqis to conduct engineering missions within their own organizations, the MNSTC–I J7 Engineering Directorate stands ready to meet the future challenges of joint engineering within Iraq.

Major Ware is a joint plans officer and the program manager for foreign military sales construction, MNSTC–I J7 Engineering Directorate, Phoenix Base, Iraq. He has served in a variety of combat, general, and geospatial engineering assignments in the continental United States and overseas. His e-mail address is <jared.ware@us.army.mil>.

Understanding the Army Environmental Structure

By Ms. Martha M. Miller and Ms. Laura Carney

There are several organizations in the Army with specific environmental missions: regional environmental offices (REOs), the Army Environmental Policy Institute (AEPI), the Environmental Law Division, the United States Army Center for Health Promotion and Preventive Medicine (USACHPPM), the United States Army Corps of Engineers (USACE), the United States Army Engineer School (USAES), the United States Army Environmental Division (Department of the Army's Assistant Chief of Staff for Installation Management–Installation Services Environmental [DAIM–ISE]), and the United States Army Environmental Command (USAEC). It's important to understand the differences between each organization's specific mission so that inquiries and requests for information can be properly directed to get expedient responses and assistance to ensure the health of Soldiers while also accomplishing the mission. (For the entire organizational structure of the Army's environmental agencies, see chart, page 63.)

Organizations and Missions

REOs and AEPI

The REOs and the AEPI fall under the Deputy Assistant Secretary of the Army for Environment, Safety, and Occupational Health. The Army's Strategy for the Environment sets forth the triple bottom line of sustainability—mission, environment, and community. REOs work to reach this bottom line by opening lines of communication, coordinating efforts, and facilitating solutions to ensure the readiness of the Army and the well-being of people and the environment. REOs are regionally based teams focused on helping the Army and its installations rapidly respond to and resolve environmental issues that might adversely affect operations. They conduct important legislative and regulatory monitoring and outreach activities within their regions. They work with military leaders, legislators, and regulators to ensure that the military can conduct training and operations while complying with environmental regulations. They coordinate regionwide environmental issues; review, analyze, and comment on proposed and existing state legislation and regulations; facilitate partnerships with states, tribes, and other federal agencies; communicate Army and Department of Defense (DOD) positions; share ideas and innovations; leverage regional, state, and local environmental management resources; and serve as Army and DOD experts for environmental regulatory and legislative issues in their regions.

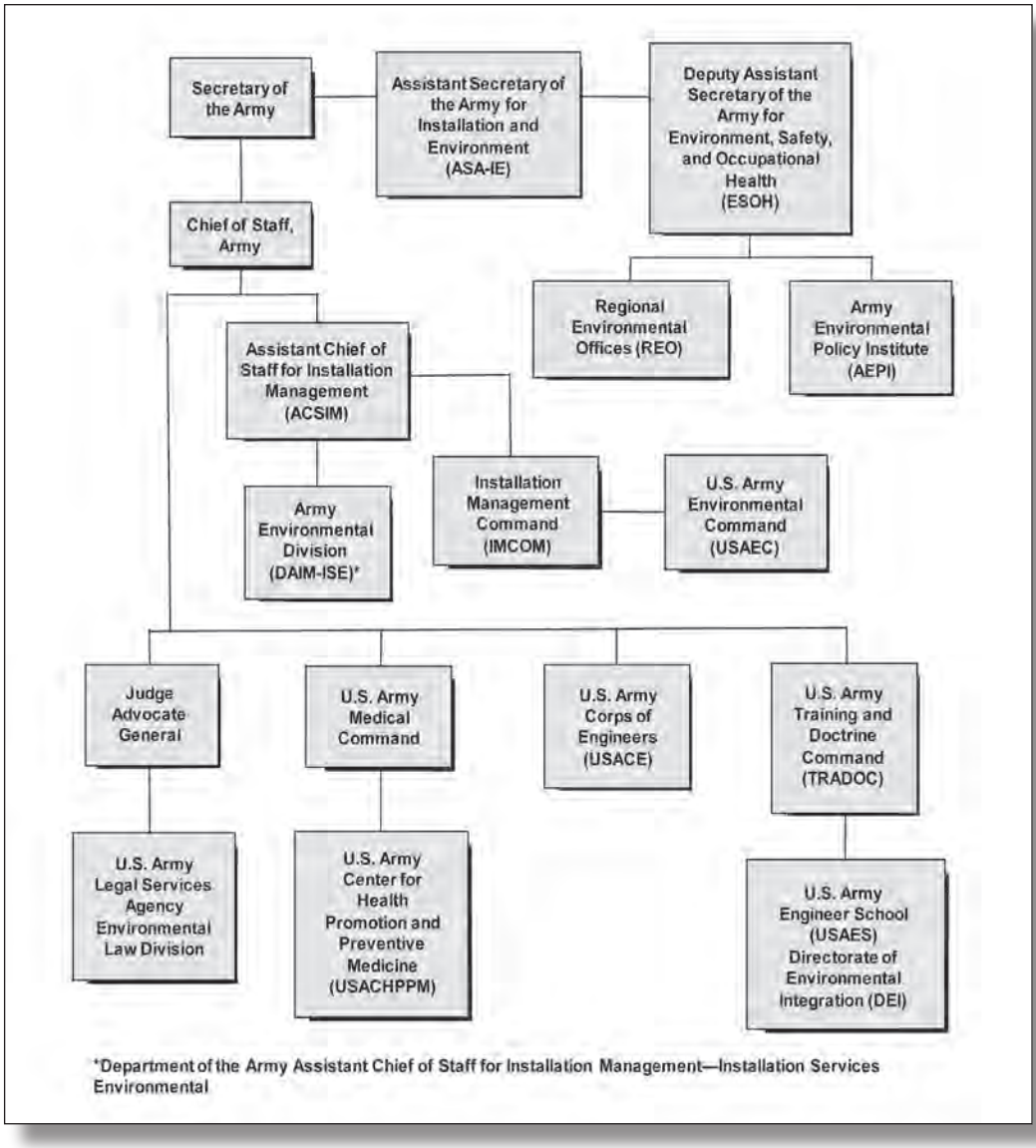
AEPI conducts studies of emerging and existing environmental issues that may significantly impact the Army, then helps develop proactive policies and strategies that affect the sustainment of Army installations and operations. This is a persistent process because environmental issues continually emerge as awareness and technology progress. AEPI's responsibility is to inform the Army secretariat about environmental challenges and opportunities that affect the Army. Its initiatives help the Army sustain readiness, improve quality of life, strengthen community relationships, and reduce total costs of ownership by suggesting sound environmental investments for force transformation and installation sustainability.

Environmental Law Division

The Environmental Law Division, as part of the United States Army Legal Services Agency, provides commanders and their staffs with accurate and proactive legal advice—and representation when necessary—on all environmental compliance issues affecting the Army.

USACHPPM

As part of the United States Army Medical Command, USACHPPM provides worldwide technical support for implementing preventive medicine, public health, health promotion and wellness services, and environmental health and environmental quality programs



for all aspects of the Army and the Army community. It anticipates and rapidly responds to operational needs and remains adaptable to a changing world environment. Its primary focus is to—

- Prevent and control diseases and injuries of military significance.
- Promote health and well-being in military populations.
- Anticipate, identify, assess, and control occupational and environmental health hazards.
- Control advanced and sustainment preventive medicine training.
- Provide targeted health information.

The USACHPPM team is key to the medical support of combat forces and the military managed-care system. It provides worldwide scientific expertise and services in clinical and field preventive medicine, environmental and occupational health, health promotion and wellness, epidemiology and disease surveillance, toxicology, and related laboratory sciences. It supports readiness by keeping Soldiers fit to fight, while promoting wellness among their families and the federal civilian workforce. USACHPPM supports all Soldiers and federal civilian employees, regardless of their branch of Service.

USACE

USACE provides vital public engineering services in peace and war to strengthen the nation's security, energize the economy, and reduce risks of disasters. Its Military Programs Environmental Division manages, designs, and executes a full range of cleanup and protection activities; complies with federal, state, and local environmental laws and regulations; minimizes use of hazardous materials; and conserves natural and cultural resources. The division supports strategic integration such as Base Realignment and Closure, the Gulf Region integration and security assistance, military construction transformation, and stability and reconstruction operations.

USACE has a civil works environmental mission to ensure that all its projects, facilities, and associated

lands meet environmental standards. It supports military construction and demolition projects; provides environmental, real estate, international, and interagency services; and provides support for installations and contingency operations.

The Engineer Research and Development Center (ERDC) comprises the following regional research facilities within USACE:

- Coastal and Hydraulics Laboratory, Vicksburg, Mississippi
- Environmental Laboratory, Vicksburg, Mississippi
- Geotechnical and Structures Laboratory, Vicksburg, Mississippi
- Information Technology Laboratory, Vicksburg, Mississippi
- Construction Engineering Research Laboratory, Champaign, Illinois
- Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire
- Geospatial Research and Engineering Center (previously the Topographic Engineering Center), Alexandria, Virginia

These laboratories synergistically address research and development (R&D) in four major areas:

- Military engineering
- Geospatial research and engineering
- Environmental quality for installations
- Civil works or water resources

ERDC is one of the most diverse engineering and scientific research organizations in the world. It conducts R&D in support of the Soldier, military installations, USACE civil works mission, other federal agencies, state and municipal authorities, and American industry. ERDC R&D focuses on five primary technical areas to support the Army and USACE:

- Warfighter support with geospatial information, system development, operational support, force protection, and force projection and sustainment
- Transformation, operation, and environmental issues of installations
- Environmental remediation and restoration, land planning, stewardship and management, threatened and endangered species, and cultural resources
- Water resources and infrastructure, environmental issues, navigation, flood control, and storm damage reduction
- Information technology, informatics, geospatial technologies, computational services, and high-performance computing applications

Integrated teams of engineers and scientists within ERDC can address a wide range of scientific and technological issues. Some issues previously addressed are the effects of arctic temperatures, vehicle mobility in desert sands, the protection of wetlands, the pinpointing of exact locations of unexploded ordnance, the prediction of habitat ranges for endangered species, and most important, the protection of Soldiers in various conditions.

USAES

Under the United States Army Training and Doctrine Command, the USAES commandant is one of the senior leaders within the Army environmental community, serving as the proponent for the development and integration of environmental considerations across the domains of military operations and doctrine, organization, training, materiel, leadership and education, personnel, and facilities (DOTMLPF). With this mission, USAES developed the Army Environmental Integration Plan and formed the Directorate of Environmental Integration (DEI).

The mission of DEI is to fully implement the Army Environmental Strategy and integrate the environmental perspective into the Army's Future Force concept. To meet this goal, DEI—

- Integrates environmental considerations and incorporates lessons learned into all appropriate Army and joint publications and references.
- Provides an organization of environmental subject matter experts to support operational requirements.
- Develops and provides training for military and civilian personnel.
- Develops military and civilian leaders who understand their environmental responsibilities and incorporate environmental considerations into their operational planning and decisionmaking.
- Instills an environmental ethic and situational awareness in Soldiers and civilians to support the Army environmental vision.
- Enhances quality of life and community relations.
- Ensures that environmental considerations are incorporated where support functions are provided to the operational force.

The goal is to integrate environmental considerations in support of the Army's mission while protecting the force and the environment by building a professionally competent force with the appropriate skills, knowledge, and environmental ethics.

DEI provides many environmental products, examples of which include—

- Army correspondence course programs.
- Training videos, graphic training aids, and training support packages.

- Doctrine products such as field manuals and training circulars.
- Environmental Baseline Survey and the Occupational and Environmental Health Site Assessment Handbook.
- Environmental, Safety, and Occupational Health Base Camp Handbook.
- Online training catalog and courses.
- Environmental Deployment Toolkit compact discs.
- Joint environmental training.
- Environmental management system training materials.

The organization also has mobile training teams that can provide predeployment environmental training when needed. DEI is actively involved with various Army and multiagency committees and work groups.

DAIM–ISE and IMCOM

The Army Environmental Division (DAIM–ISE) and Installation Management Command (IMCOM) operate under the Assistant Chief of Staff for Installation Management (ACSIM). ACSIM and its subordinate organizations focus on the concerns specific to military installations. DAIM–ISE is the principal advisor to the ACSIM regarding environmental programs. It develops strategic policies and establishes priorities, resources, strategy, and program guidance related to managing and resourcing all environmental programs. It also ensures that environmental program priorities and activities enable the Army mission. Its vision is to foster environmental stewardship and installation sustainability through integration of environmental values.

DAIM–ISE develops and issues Army Environmental Program priorities so that subordinate elements have adequate authority to accomplish installation/activity missions. It has the responsibility for environmental program resource requirements, validation, and programming of resources into the program objective memorandum and establishment of resource levels to support the Army Environmental Program priorities. Coordination is conducted internally and with Army staff elements, the Secretary of the Army staff, Army commands, Army service component commands, direct reporting units, the Reserve Components, and field operators to ensure that environmental requirements are integrated into their programs. It participates in federal department-level meetings and workgroups led by the Office of the Secretary of Defense to represent service-level positions on issues affecting the Army's mission.

The development and visibility of environmental program issues are maintained through coordination with components and states. Program reviews for performance management are conducted according to established strategies and program priorities. DAIM–ISE prepares briefings, information papers, and reports for Army leadership and Congress and supports audits and Freedom of Information Act requests.

USAEC

USAEC is directly subordinate to IMCOM in the Army environmental structure. Over the past 36 years, under various names and through evolving missions, USAEC has supported the Army's expanding role as a world leader in environmental stewardship and responsibility. It integrates, coordinates, and oversees the implementation of the Army's environmental programs for the Army staff. Armed with lessons from the past and the vision of a transforming Army, USAEC provides the knowledge, tools, and program development assistance that enable military readiness and sustainable military communities through training, operations, and acquisition, using sound environmental practices.

The command provides a broad range of environmental products and services to Headquarters, Department of the Army, major commands, and commanders worldwide, including leadership, focus, direction, and innovative solutions to the Army's future environmental challenges. USAEC has developed and sustains a team of environmental professionals dedicated and empowered to accomplish the mission through the support of military installations.

Environmental Purpose

There are several different organizations within the Army with specific environmental missions. Each organization supports the Army mission, its strategy for the environment, and its installations worldwide; ensures compliance with environmental laws and regulations; and ensures the health and well-being of the Army's Soldiers and their families through the use of sustainable practices and programs.

Ms. Miller is an environmental protection specialist with the Directorate of Environmental Integration at the United States Army Engineer School at Fort Leonard Wood, Missouri. Previously, she was the hazardous waste and underground storage tank program manager for the Illinois Army National Guard. She obtained professional credentials as a Certified Hazardous Materials Manager in 2005 and holds a bachelor's from Monmouth College, Monmouth, Illinois. She has been a member of the Illinois Army National Guard for 23 years and is a sergeant first class with the Illinois Joint Force Headquarters.

Ms. Carney is an environmental protection specialist with the Directorate of Environmental Integration at the United States Army Engineer School at Fort Leonard Wood. Previously she was an environmental protection specialist at United States Army Dugway Proving Ground, Utah, where she served as program manager for the installation Environmental Management System, pollution prevention, recycling, hazardous waste minimization, and environmental reporting programs.

Can the Modular Engineer Battalion Headquarters Be Multifunctional?

By Major William C. Hannan

The 5th Engineer Battalion received its deployment order for Operation Iraqi Freedom late in 2007 and deployed the following year. The battalion had recently transformed to the new modular structure, and its three mechanized companies became one sapper company and two mobility augmentation companies (MACs). Its projected mission in Iraq was route clearance, rapid crater repair, route sanitation, and culvert denial, so the battalion trained hard for those tasks. That training included a mission readiness exercise at the National Training Center, Fort Irwin, California. However, soon after deploying to Iraq, the battalion was involved in multiple construction projects across the areas of operation of two brigade combat teams (BCTs). Regardless of the type of engineer battalion or the missions its leaders expected to have, those BCTs needed immediate construction and technical support.

Engineer Modularity

The concept of engineer modularity is that an engineer battalion can command and control, plan, integrate, and direct the execution of two to five engineer companies (sapper, mobility augmentation, horizontal, vertical, multirole bridge, or other specialty unit), depending on the mission and engineer requirements. The majority of engineer battalions that have deployed to Operation Iraqi Freedom and Operation Enduring Freedom conducted operations across multiple engineer functions on an area basis. They have mostly performed combat and general engineering, but some also provided geospatial engineering. This arrangement offers many advantages over a single-function battalion that only conducts either combat engineering or general engineering missions. However, in order to capitalize on these advantages, the engineer battalion must organize and train correctly so it is able to conduct operations across all engineer functions.

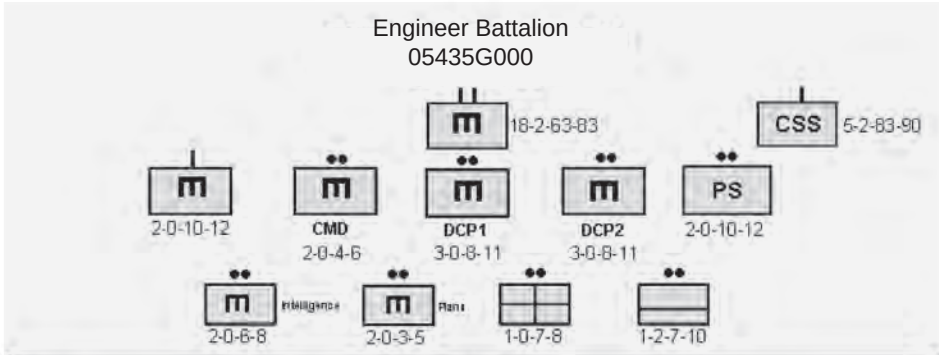
While in Iraq, the 5th Engineer Battalion commanded and controlled two sapper companies, two MACs, a combat support equipment (CSE) company, a horizontal engineer company, and a multirole bridge company (MRBC), as well as an Air Force utility detachment and a geospatial team. Like most previous combat engineer battalions in its position, the 5th could easily plan and execute the combat engineering tasks and was able to quickly execute geospatial tasks that supported all operations. The biggest challenge for the 5th, and many of the other battalions deployed, was construction management or tasks within the general engineering function. Unfortunately, the new engineer battalion organization (see Figure 1) is not built to effectively manage construction operations.

5th Engineer Battalion Soldiers perform a culvert repair mission in Diyala Province, Iraq.

Battalion Staff Organization

Proper organization of the engineer battalion staff is the first hurdle to conducting construction management. The 5th Engineer Battalion managed the construction effort for one horizontal engineer company, one CSE company, and an Air Force utilities detachment (the equivalent of 6 horizontal platoons, 2 vertical platoons, and a utility repair platoon). Additionally,

Shaded Section: FM 3-34, Figure B-7, Page B9



MISSION

To provide an engineer headquarters for command and control of engineer operations in the AO.

CAPABILITIES

- Conducts engineer missions with 2-5 task-organized engineer companies and other force pool units.
- Provides command and control of units task-organized to the battalion.
- With task-organized engineer units, the battalion is capable of conducting engineer operations including combat and general engineering missions.
- With task organized combined arms units, the unit is capable of conducting of combat missions, when required.
- With task organized units, the unit is capable of conducting area damage control, when required.
- Provides unit administration, religious, and logistic support to task-organized units.
- Provides two scalable, deployable command posts as required.

DEPENDENCIES

- Appropriate elements of corps or division for religious, legal, health service support, finance, personnel and administrative, and logistical services.
- TOE 63357G000, FSC EN BN, for field feeding support, fuel and supplemental transportation of Class IV and V supplies as well as support for limited field maintenance.

SUPPORTS

- The battalion headquarters provides C2 for engineer operations supporting brigade, division, or corps operations.

RULE OF ALLOCATION

One engineer battalion headquarters per 2-5 engineer companies.

Figure 1

the battalion conducted quality assurance/quality control (QA/QC) inspections, performed the duties of a contracting officer technical representative, and assisted with technical scope-of-work reviews and project creation for BCT and provincial reconstruction team civil capacity projects. There was a tremendous need for technical planning, support, resourcing, and execution at the battalion level. The engineer battalion modified table of organization and equipment (MTOE) has construction noncommissioned officers (NCOs) with construction military occupational specialties (MOSs) throughout the staff structure (see Figure 2), but there is no construction cell to coordinate and synchronize efforts to ensure that the commander's priorities are being met.

The battalion restructured just before deploying, based on the need for deliberate construction planning and execution. Figure 3, page 68, shows how the 5th reorganized for Operation Iraqi Freedom. This restructuring was essential in order to provide efficient, quality construction. Although most of the needed MOSs were within the battalion MTOE,

Construction MOS Positions in Engineer Battalion

Figure 2

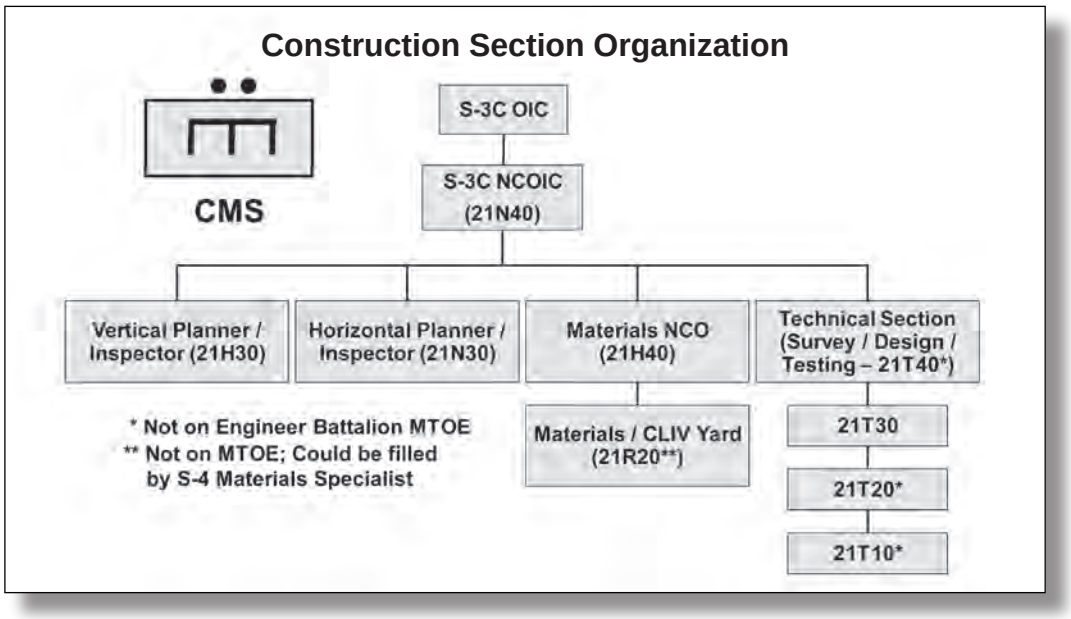


Figure 3

not having a dedicated construction management section (CMS) before deployment severely degraded construction management for the first six months of the deployment. Those six months were spent developing the battalion's construction systems, acquiring needed equipment and software, and delineating duties and responsibilities. An important MOS not included in the battalion MTOE was a technical engineering specialist, or 21T. The battalion is authorized one senior technical engineering specialist in the plans section, but in order to conduct survey, design, soil testing, concrete testing, compaction testing, and other technical requirements, a battalion needs at least four Soldiers with that specialty. The 5th deployed with one excess NCO with the specialty and pulled two more Soldiers with that MOS up to the battalion CMS from an attached company.

Technical equipment is also missing from the engineer battalion MTOE. When creating the technical section in the CMS, the battalion procured soils and concrete testing and analysis equipment, global positioning system survey instruments, electric density gauges, AutoCAD®, Theater Construction Management System (TCMS), and Microsoft® Project software. See Figure 4 for a list of the minimum equipment needed for a technical section at the battalion level. Under modularity, this gap could be fixed by attaching a survey and design team at an allocation of one team per three construction companies, but the reality is that engineer battalions often do not get this asset. Some engineer battalions with "combat heavy" roots had a survey and design team even if the battalion had fewer than three construction companies. While engineer brigades have a survey and design section on their MTOE, battalions cannot count on the brigade's team to support the battalion's requirements. Additionally, engineer battalions are often directly attached to divisions and need an internal capability for survey, design, and testing. Without the technical section and/or equipment, the battalion is unable to properly design projects or conduct QA/QC inspections. It is difficult for a battalion to enforce construction standards when it does not have the capability to test or build to a defined standard.

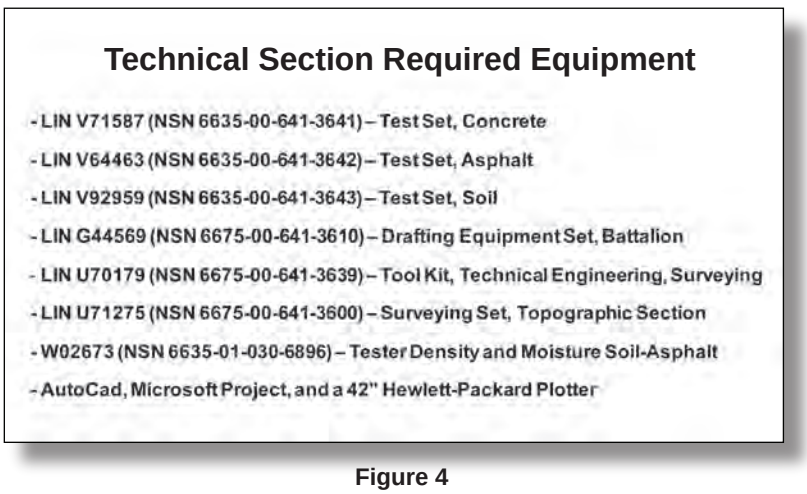


Figure 4

Predeployment Training

The second concern for the engineer battalion is training construction management and general engineering tasks before deployment. Without a dedicated construction officer and CMS on the MTOE, units often overlook the need to train these tasks when not deployed. Units normally do not assign a construction officer unless they have roots as a combat heavy or construction effects battalion or have modular construction units attached in garrison. Additionally, construction NCOs on staff are often assigned as operations, schools, or training NCOs. With the loss of technical capability in the Engineer

A 5th Engineer Battalion survey team sights in a road during construction operations.

Regiment, it is even more important now to continue to develop technical skills in officers and NCOs.

Once the first obstacle is cleared and the battalion maintains a permanent CMS, the next step is to conduct individual and collective training. The construction officer needs to be a degreed engineer with skills in contracting, project management, survey and design management, writing technical scopes of work and construction directives, QA/QC, Microsoft Project, and TCMS. The NCOs in the CMS need similar skills, but specifically as they apply to their MOS or duty position. Collective training is more difficult for several reasons. First, engineer battalions are not multifunctional before they deploy, with a few exceptions such as the 54th Engineer Battalion in Germany. Most either have all-modular combat units, such as sapper or MAC companies, or modular vertical or horizontal construction companies. This causes weaknesses in both types of engineer battalions, although those with modular construction companies in garrison can usually transition easier into a multifunctional battalion. The engineer battalion without modular construction companies in garrison normally is not organized or trained to manage construction and has a much steeper learning curve when transitioning to a multifunctional battalion.

One potential solution to the issue would be to organize battalions in garrison as multifunctional battalions. When possible, engineer brigades should organize battalions with both modular combat and construction companies. This will enable the engineer battalion to train its staff across all engineer functions. For example, the 94th Engineer Battalion—previously a combat heavy unit but now composed entirely of modular construction companies—and the 5th Engineer Battalion—previously a corps mechanized unit but now comprising all modular combat companies—are both located at Fort Leonard Wood, Missouri, under the 4th Maneuver Enhancement Brigade. In order to enable the staffs of the 94th and 5th Engineer Battalions to train across all engineer functions, they could each give one organic company to the other battalion. If that was not feasible, they could attach companies to the other battalion for specific training events or construction projects.

Another issue affecting collective training is the ability to plan, develop, resource, and execute construction projects in garrison similar to ones that will be expected in a theater of operations. Every engineer battalion needs to work construction planning into its training plans, though it is often difficult because construction projects in garrison are difficult to resource and synchronize. The members of Air Force construction units are highly skilled in their specialties because they execute construction projects and continually work in their specialties while in garrison. For major training events such as a trip to the National Training Center, units should plan and resource construction far enough in advance to enable a construction unit to complete a project during or adjacent to a rotation. The planning of the project

Engineers clear and grub a road during construction operations.

would be training in itself. The focus should not be strictly on finishing the project within the rotation window, since that would limit the scope to small projects only. Rather, the focus should be on projects similar in scope to those the unit will build while deployed.

Quality and Efficiency Ensured

The 5th Engineer Battalion completed more than 150 construction projects during one Operation Iraqi Freedom deployment, including road construction and repair, helicopter landing zones, joint security stations, combat outposts, force protection construction and upgrades, Southwest Asia huts for housing expansions, electrical upgrades, and numerous other projects. The battalion was only able to ensure quality and efficiency after creating a CMS, acquiring the right technical equipment, and developing officers and NCOs with skills in contracting, project management, survey and design management, resource management, writing technical scopes of work and construction directives, and QA/QC planning. Much of this development was the result of on-the-job training. All engineer battalions should continue to build and retain great engineers, which requires a properly organized battalion CMS that improves technical capability through training focused on construction management.

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ENGINEER MODULARITY

By Lieutenant Colonel Steve Danner and Mr. Don Wenzel

At the time that the Engineer Regiment began its transformation to the Future Engineer Force structure, the United States Army was pursuing a parallel effort to transform its basic warfighting force from a division-centric force to the modular brigade combat team (BCT) force. Engineer modularity was a central linchpin that supported the transformation of that division force to the BCT force. The original premise was for those engineers who would be needed routinely to support mobility capabilities to remain as part of the BCT. All other engineer force structure capabilities would migrate to the Engineer Force Pool.

Categories of Engineer Modularity

Engineer modularity is identified by four categories:

- Embedded
- Baseline
- Mission modules
- Engineer command and control (C2)

Embedded. The embedded engineer force structure is the engineer structure organic or assigned to the BCT. The remaining three categories are part of the Engineer Force Pool.

Baseline. The baseline structure is the seven basic engineer companies:

- Sapper company (airborne, wheeled, and tracked)
- Mobility augmentation company (MAC)
- Multirole bridge company (MRBC)
- Clearance company
- Horizontal construction company
- Vertical construction company
- Engineer support company

Mission Modules. Engineer mission modules consist of the following:

- Asphalt team
- Concrete team
- Construction management section
- Engineer detachment-headquarters (canine)
- Engineer squad (canine)
- Engineer diving team
- Engineer facility detachment (EFD)
- Equipment support platoon
- Explosive hazards team (EHT)
- Explosives hazards coordination cell (EHCC)
- Firefighting team
- Headquarters and fire truck
- Forward engineer support team–main (FEST–M)
- Forward engineer support team–advance (FEST–A)
- Geospatial planning cell
- Prime power battalion
- Prime power company
- Quarry platoon
- Real estate team
- Survey and design team
- Well drilling headquarters and team
- Topographic company

Engineer Command and Control. Engineer C2 consists of the engineer battalion, headquarters and headquarters engineer brigade, and theater engineer command.

During the Army Force Generation (ARFORGEN) cycles of *reset, train/ready,* and *available*, the baseline force structure engineer companies are designed so that a company commander can focus on specific individual and collective tasks associated with the specific capabilities of the company. That way a sapper company can concentrate on combat engineer tasks, a MAC on assault breaching and bridging and countermobility tasks, and an MRBC on bridging. During the *train/ready* phase, the battalion commander sees that the collective tasks appropriate for an engineer mission team are trained. In effect, this creates task-organized companies capable of performing engineer missions related to specific missions.

A key factor in developing the right engineer force structure is the planner involved in the request for forces. In some cases, the planner will not be an engineer, so it is imperative that planners at all levels are familiar with the specific capabilities that each baseline or engineer mission module brings to the fight. Engineers at each level of the fight need to be able to articulate these capabilities to planners.

(continued on page 76)

Protecting Secure Facilities From Underground Intrusion Using Seismic/Acoustic Sensor Arrays

By Lieutenant Colonel Robert E. Tucker Ph.D., Colonel James R. Rowan (Retired), Dr. Jason R. McKenna, Dr. Lillian D. Wakeley, Mrs. Sarah McComas, Ms. Julie R. Kelley, and Mr. Thomas E. Berry

The necessity to detect tunnels that penetrate secure facilities such as detention centers, government offices, borders, or forward operating bases (FOBs) has developed from the need to deter or counter underground exploitation along the southern United States border, Iraq, and other facilities. The United States Army has been in the tunnel detection business for many years, to include providing support to other government agencies in locating tunnels along our southwest border. Iraq became an issue with the nearly successful escape from a tunnel constructed over several months by detainees in an Iraqi center.[1] A team of researchers was sent to Iraq to investigate the utility of several technologies that perhaps could detect voids as small as 1 meter in diameter. A third technology investigated was a passive seismic/acoustic array. The team built a 7-meter-deep tunnel at the same depth as the escape tunnel.[2] The array was tested around the camp to garner the seismic and acoustic characteristics of the typical vehicles and machinery and their interactions with the soil and each other. The in-tunnel tests were conducted using typical digging tools available to the detainees. All of these signals were then used to "train" the computer algorithms. Plans were laid for a larger study and more detailed sediment and mineral studies. There is a definite requirement to thoroughly understand the interactions between sound propagation and the local geology and geochemistry of the sediments.

Site Geology

Distribution of mineral composition, grain size, and moisture content of soils are known to affect attenuation of electromagnetic and other geophysical sensor signals.[3, 4] The geologic setting of an area determines the suitability of a given technique for locating visually obscured features such as tunnels in the shallow subsurface.

In the area surrounding the test tunnel, the upper 6 meters of sediments were deposited as part of a delta during a time of higher sea level, when low-gradient rivers carried fine-grained sediments into a shallow sea. The resulting sediments vary in thickness, density, moisture content, and color—both horizontally and vertically. These sediments are now overlain by fine-grained, windblown material. Subsequent natural and man-caused processes have changed much of the original sedimentary layering.

The upper sediments can be cemented with either calcium carbonate (calcite) or calcium sulfate (gypsum) to a depth of about 30 centimeters and are difficult to dig through. In the upper layer, the gypsum forms veinlets some 5 millimeters in diameter and spaced quite closely throughout the layer. Crystals of gypsum up to 3 centimeters in length are present in the upper layers. The lower sediment layers are typically devoid of visible gypsum crystals. These veinlets are hard, making digging difficult and producing definite signatures that can be picked up with the sensors (see Figure 1).

Figure 1: Typical strata sequence in the study area. Subtle vertical color changes represent varying geochemical characteristics of the sedimentary environment.

At some locations in the study area near the surface, there are substantial areas of white cemented sand that is locally called "gatch" (see Figure 2, page 73). Gatch forms when carbonate or sulfate minerals (calcite, gypsum, or both) are deposited by movement and evaporation of water in the pore space of previously deposited sand.[5] When water is mixed with a 50-50 mixture of gatch and other surficial material, an extremely hard block is formed. This local geochemical phenomenon has significant impact on potential tunnel

Figure 2. A layer of gatch about 20 centimeters below the surface. This layer was about 10 centimeters thick.

construction. The top some 20 centimeters of fine windblown sand is loose, but below that, the sand is cemented. This layer is strong enough to support pedestrian traffic and even heavy equipment. Thus, even in highly disturbed sediments and sands, stabilized shallow tunnels are possible after just a short time.

On the FOB, a thick sequence of unconsolidated sand occurs at about 7 meters. This coarse sand is composed of angular grains of quartz (particles 2 millimeters in diameter) and extends at least 1 meter below the tunnel floor. Digging in the sand layer is easy. This sand is distinctly different from the other sediments on the FOB and, if observed on the surface, is a telltale sign of digging. Understanding the geology of an area will provide good intelligence signs of digging in any location. Use of imaging technologies can be key to detecting digging in many locations.

Within the lower sand layer and the silt just above it, black concretions appear as very hard clusters of sand grains cemented in a star-burst pattern by a black mineral up to 3 centimeters in diameter (see Figure 3). Digging through these mineral clots makes a distinct high-pitched sound when they are struck with an entrenching tool or chisel.

Figure 3. Black mineral concretions at the tunnel face. Striking these minerals makes a distinctive noise.

The extraordinary lateral and vertical variability of the sediments in the upper several meters of soil at the site caused the failure of traditional geophysical techniques to locate tunnels or voids. The presence of fine-grained minerals and soluble salts increased the conductivity of the soil and precluded downward propagation of signals from methods such as ground-penetrating radar and electromagnetic surveys. These unfavorable geologic factors prompted the team to develop passive seismic-acoustic technologies to detect tunneling activity rather than the tunnels themselves.

Initial Experiments

The initial project centered on data collection from a tunnel the team dug at the interface of the compacted silt layers and the unconsolidated coarse sand layer. The sensor array was placed at right angles to the tunnel and data collected over several days.[6] This data was used to populate the computer algorithms and train the users. During data collection, the rainy season began. This 36-hour rain event provided an excellent opportunity to compare the effect of soil moisture on the propagation and receipt of signals by the array.[7] The rain event allowed the team to quantify the signal changes from the full range of mechanical and other sources on a secure facility. The most significant impact was the increase in amplitude; nearly all signals were detected from greater distances through moist soil than had been observed during the dry season (see Figure 4).

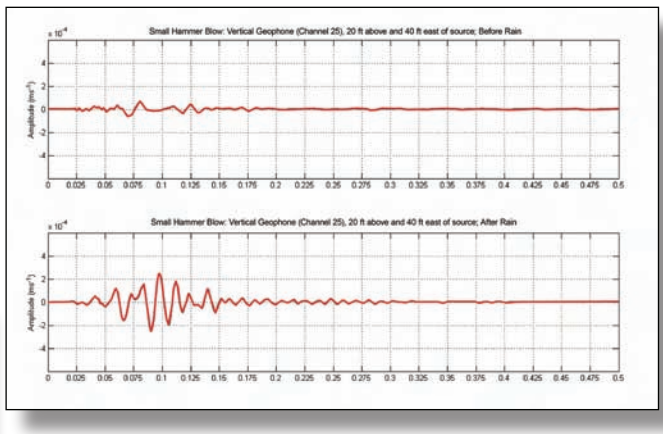

Figure 4. Ambient acoustic noise field before and after 36 hours of steady precipitation.

Beetles, insects, and rodents burrow within the sediments and can dig large galleries. With extended reach of the data collection array in a wet environment, some of these signals could be identified as human digging without proper analysis.

During the 2008 sampling season, detailed soil samples were collected. Long trenches were dug to a depth over 2 meters and a small block of one wall was selected for sampling. Ten centimeters deep, drive cylinders were used to collect *in situ* samples. The soil around the cylinders

was carefully removed and saved for further analysis (see Figure 5). The collection process continued to a depth of about 2 meters.

Figure 5. The top panel shows the drive cylinders before emplacement. The middle panel shows the emplaced cylinders. The bottom panel shows the cylinders just before being removed from the sample layer.

Array Around the Camp

The physical tests and the soil analysis indicated that a seismic and acoustic array could be installed around a facility. Automated processes could be used to filter out the vast majority of the energy sources while still differentiating the signals of interest that were likely tunnels being constructed or tunnels being used.

Commercial off-the-shelf geophones were emplaced around compounds where tunnels had been found. Sensors were placed in pairs (one deep and one shallow) at regular intervals covering the entire perimeter. The geophones were connected to a buried cable that circled the compound. Installation of the sensors and associated cabling required a significant effort because the compound infrastructure was already in place. Detection systems need to be integrated into the construction design and installed with initial construction when possible.

Placing the geophones in pairs was crucial to discriminating between deep and shallow energy sources. Acoustic sensors were placed at regular intervals to help filter out the huge amount of surface background noise from sources that included vehicles, generators, rotary wing aircraft, explosions, and conversations.

After the signal was digitized, it went through an outside the continental United States (OCONUS) filter to determine which signals have characteristics similar to the signals of interest. An initial statistical analysis of these signals was computed to reduce the amount of data sent to the Continental United States (CONUS) via a satellite uplink. The data CONUS received went through a set of sophisticated algorithms which again reduced the data the analyst needed to review. The signals that remained were generally of interest to the analyst. The filtering processes significantly reduced the amount of data that needed to be reviewed by a human, but still the most important part of the system was a human analyst. Each area of interest was reviewed by a trained analyst to determine what kind of energy source produced the signal, whether the signal was generated by threat activity (such as digging with a hand tool—scraping of tools against wall or floor) or clutter activity (such as construction, vehicle traffic, or generators). This was completed by looking and listening to sections of the digitized signal since the human eyes and ears comprise one of the best pattern-recognition systems. The analyst was able to identify these signals by comparing them to signals from the Tunnel Activity Detection System (TADS) signal library. This library included both types of signals—threat activity and clutter.

After an analyst identified an area with threat activity (see Figure 6), he sent a notification to the appropriate authority at the secure facility. These notifications were vetted to determine if they were actually threats. The results of this process produced great success and were added to the signal library to further expand our knowledge of the threat.

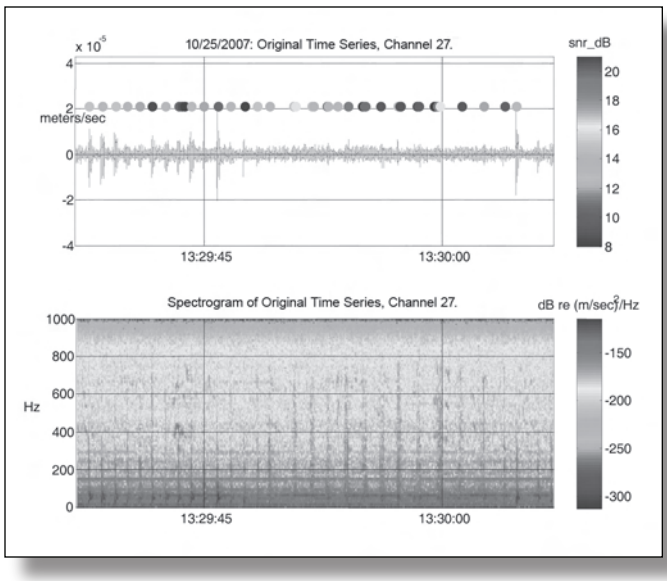

Figure 6. An example of threat activity. The lines in the lower graph (between 10 hertz and 400 hertz) are impacts with a hand tool. The dots above top graph indicate detections made by the TADS algorithm.

Recent Threats

After a unit received a tip that something strange was going on there, a young lieutenant led his patrol to a bakery where two men were sitting. The quiet street in Mosul quickly became a hub of activity. The patrol noted that there was no bread or even flour in the bakery, just shovels and piles of dirt. The patrol discovered the tunnel entrance, and a check of the database showed that the two men had been arrested earlier on suspicion of being al-Qaeda supporters. A tunnel went about 50 feet from the bakery toward a secure governmental facility. The plan seems to have been to set a large amount of explosives in a gallery under the facility to inflict as much damage as possible.[8] The tunnel appeared to be constructed in compacted sediments with only a few rocks. The sediment seemed relatively strong and did not appear to require a lot of shoring to provide short-term use of the structure.

On 2 September 2008, another tunnel was discovered on our southwest border, with its origins in a house in Mexicali, Mexico, heading toward Calexico in the United States (see Figure 7). The tunnel—about 1.5 meters wide by 2 meters high and about 5 to 6 meters below the surface, with lights, piped air, and rails—appeared to have been dug with hand tools through compacted sediments. The soil was competent enough to hold its shape, allowing the builders to use minimal supports.

Conclusions

Tunnels remain a persistent threat to U. S. security, both at home and abroad. Due to the highly local and variable nature of the near surface, imaging techniques to discover tunnels has met with many challenges. The most promising technology was passive seismic/acoustic arrays. Through the second deployment, the team constructed an array around a secure facility. The initial data were added to the more extensive subsequent data and used to "train" the algorithm.

The installation, validation, and transition of this system were an overwhelming success, advancing from a field test in 2005 to a fully operational system in a combat zone in one generation. Over the first three months of operation and experience, the analyst tasks were reduced by an order of magnitude and the signal-processing algorithms were continually improved.

A systematic geologic and geochemical investigation of the impacts of soil properties on seismic/acoustic wave propagation could benefit further refinement of the algorithm. The geologic and geochemical aspects of the physical environment will impact the ability to detect active tunneling or tunnel use, as well as the actual construction of a tunnel. Understanding this physical environment will have effects on the design and construction of secure facilities and the construction materials used. Knowledge of the subsurface soils will provide clues to tunneling activities by direct and indirect observation on and away from a secure facility. The use of tunnels to penetrate or breach secure facilities has been used for thousands of years (with sappers and mining engineers leading the way). The current struggles in Southwest Asia are no exception to the threat of subterranean intrusion (tunneling). Engineers with geology/geochemical/geophysics expertise could make technical assessments throughout the planning and execution phases of these projects. The engineers and military police must work together to mitigate this threat and continue to protect our secure facilities from subterranean intrusion.

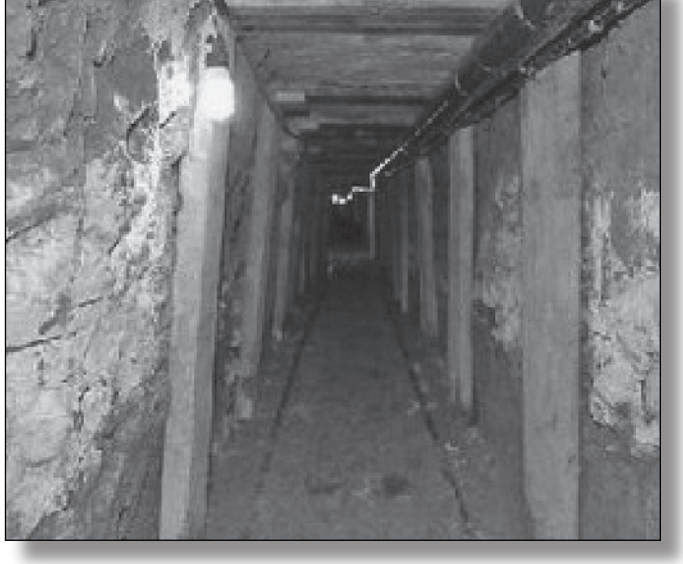

Figure 7. Discovered tunnel leads from Mexicali toward the United States.

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Mr. Berry is a research biologist in the Environmental Laboratory, Environmental Sensing Branch, at ERDC. In this capacity, his expertise is terrain background characterization using EO/IR, LiDAR, Spectrometers, and RTK-GPS. He has supported several military programs both CONUS and OCONUS, specializing in countermine technologies. He holds a bachelor's in landscape management from Mississippi State University.

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("Modularity," continued from page 71)

Sharing Lessons Learned

The Engineer Regiment's transition to a modular force is now more than 90 percent complete. That means that we are beginning to see adjustments that need to be made in our organizations, as well as changes that need to be made to the tactics, techniques, and procedures we use when employing these forces. It is essential that lessons learned from the employment of our engineer forces are captured and shared so that best practices can be incorporated into the way we train and fight.

Current doctrine is being revised to address the engineer force structure at all levels to ensure that emerging lessons learned from Iraq and Afghanistan are incorporated into our doctrine. The doctrine for employment at the BCT is published, and the doctrine for echelons above the BCT is close to being published. Engineer organizations will continue to incorporate these lessons learned while still addressing the full spectrum of engineer tasks and support to enduring operations.

There are still changes being worked for the Engineer Regiment. The prime power company and battalion have been restructured to better use prime power assets. The topographic company has been restructured to provide a required capability at all levels of the fight. There is an initiative to add a geospatial warrant officer to each of the BCTs as was done for the Stryker BCT. The MRBC is being considered for review to bring its organization in line with the other baseline company structures. The clearance company is now under consideration for a force design update incorporating lessons learned from Operations Iraqi Freedom and Enduring Freedom. There is also considerable effort at this point to restructure engineer forces within the BCTs to provide a wider range of engineer capability to BCT commanders.

There will continue to be force structure adjustments to the Engineer Regiment in the coming years. Each of these efforts will be attuned to keeping it relevant to the fight while providing the commander with the best-trained, best-organized, and best-equipped force feasible.

Lieutenant Colonel Danner is Chief, Maneuver Support Organizations Branch, Concept Development Division, Capability Development and Integration Directorate, United States Army Maneuver Support Center (MANSCEN), Fort Leonard Wood, Missouri. His branch documents requirements for personnel and equipment in chemical, biological, radiological, and nuclear (CBRN); engineer; military police; maneuver enhancement brigade (MEB); 20th Support Command (CBRNE) and brigade special troops battalion (BSTB) tables of organization and equipment (TOE).

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Joint Engineer Planning and Execution System Course

By Ms. Tara C. Valencia and Mr. Brad Steffey

The Joint Deployment Training Center (JDTC) at Fort Eustis, Virginia, offers a Joint Engineer Planning and Execution System (JEPES) course for joint engineer staff members. JEPES provides commanders and engineer staff with capabilities to tailor the time-phased force and deployment data (TPFDD) for engineer requirements. The application enables the staff to identify construction requirements, align engineer force structure, build engineer-specific requirements, and provide cost estimates within the TPFDD in coordination with the Joint Operation Planning and Execution System (JOPES) community.

JEPES operates through the Global Combat Support System–Joint (GCSS–J) web portal. Engineers can—

- Import JOPES plans.
- Generate engineer reports.
- Identify base complexes and construction requirements.
- Manage engineer units and resources.
- Construct an engineer-specific plan for use in JOPES.
- Extract facilities data using the GCSS–J Query Tool.

Engineer students learn how to—

- Use all of the JEPES menu functions.
- Construct a JEPES plan.
- Share and coordinate information with other GCSS–J portal users.
- Access federated applications, such as in-transit visibility (ITV), *CIA* [Central Intelligence Agency] *World Factbook*, and Port and Airfield Collaborative Environment (PACE).

JEPES is a one-day, certificate-awarding course. Engineer students should already have completed a GCSS–J portal course or be proficient with GCSS–J prior to taking JEPES. GCSS–J courses are essential for any engineer student or engineer action officer who needs to manage engineering assets in a TPFDD or operational environment at any combatant command or joint task force.

Training is conducted at Fort Eustis or by mobile training team in conjunction with a GCSS–J portal course. A final U.S. secret clearance is required to attend. To schedule a JEPES or GCSS–J portal course, contact Mr. Keith Davison at DSN 381-0932 or <*keith.davison@disa.mil*>.

JDTC develops and delivers functional Global Command and Control System–Joint training. This includes joint deployment planning and execution, situational awareness, and global force management training and education through standardized curricula to combatant commands, Department of Defense and other agencies, and professional military education institutions. JDTC trains Soldiers, Airmen, Sailors, and Marines as they will operate, using tools essential in the command and control of combat operations, joint logistics, force planning, and deployment. Training mirrors real-world operations in a hands-on environment, under the supervision and guidance of experts through resident, mobile training team, and virtual campus instruction. Distributed learning courses are available through Joint Knowledge Online (JKO) and JDTC websites. For more information, visit <*www.jdtc.jfcom.mil*>.

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BEST SAPPER COMPETITION 2009

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